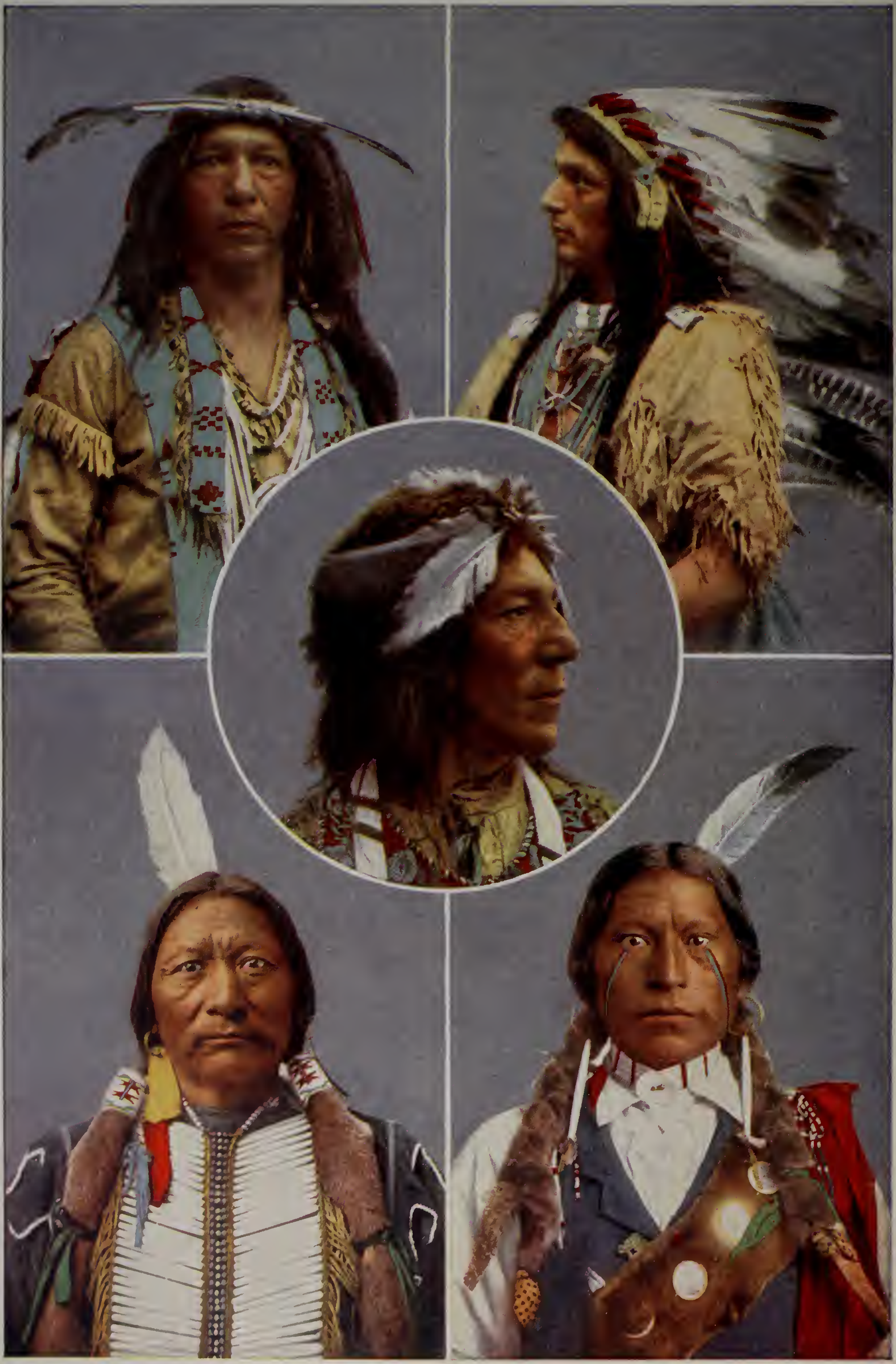
CHIEFTAINS OF A VANISHING RACE



The red men of North America, who held undisputed sway in the vast countries where now fly the Stars and Stripes and Union Jack, are no longer powerful. They must change their manner of life or they will soon be as extinct as the Aztecs of South America. A brave and picturesque race, they have always numbered among their tribes men with noble souls, like the chief described in the story "The Last of the Mohicans," on page 178.

The Book of Knowledge

The Children's Encyclopædia

EDITORS-IN-CHIEF

ARTHUR MEE
Temple Chambers, London

HOLLAND THOMPSON, Ph. D.
The College of The City of New York

With an Introduction by

John H. Finley, LL. D.
President of The College of The City of New York

DEPARTMENTAL EDITORS AND CONTRIBUTORS

All Countries
FRANCES EPPS

Natural History
ERNEST INGERSOLL

Plant Life
HELEN INGERSOLL

Stories and Legends
EDWARD WRIGHT

Familiar Things
HAROLD BEGBIE

Men and Women
ERNEST A. BRYANT

Our Own Life
DR. C. W. SALEEBY

Famous Books
J. A. HAMMERTON

School Lessons
A. M. SKINNER, B. S.

Poetry and Rhymes
A. VON HARTMANN

Dominion of Canada
W. PETERSON, LL. D., D. Litt.

The United States
HOLLAND THOMPSON, Ph.D.

The Earth
DR. C. W. SALEEBY

Golden Deeds
M. PERRY MILLS

Book of Wonder
ARTHUR MEE

Things to Make & Do
H. G. FLEMING

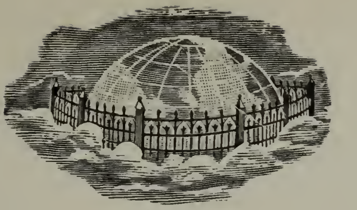
Volume XVIII.

NEW YORK: THE GROLIER SOCIETY
LONDON: THE EDUCATIONAL BOOK CO.

Text and Illustrations in this work are protected
by copyright as follows:

Copyright, 1911, 1912, by The Grolier Society
Copyright, 1911, by The Educational Book Co.
Copyright, 1910, 1911, 1912, by M. Perry Mills
Copyright, 1908, by Amalgamated Press, Ltd.
Copyright, 1868, 1870, 1872, 1874, 1875, 1876, 1878, 1881, 1883, 1884, 1886, 1887, 1888, 1889, 1890, 1891, 1902, 1906, by Ticknor & Fields, James R. Osgood & Co., and Houghton, Mifflin & Co.
Copyright, 1874, 1880, 1892, 1894, 1895, 1896, 1904, 1908, by Charles Scribner's Sons
Copyright, 1908, by The Century Co.
Copyright, 1906, by The Baker & Taylor Co.
Copyright, 1901, 1902, 1906, 1907, 1909, by H. C. White Co.
Copyright, 1897, 1907, by The American Book Co.
Copyright, 1890, 1899, by James Whitcomb Riley
Copyright by Photographische Gesellschaft
Copyright by Keystone View Co.
Copyright by Underwood & Underwood
Copyright, 1899, by R. L. Singley

The poems by Thomas Bailey Aldrich, Phoebe Cary, Ralph Waldo Emerson, Oliver Wendell Holmes, James Russell Lowell, John Greenleaf Whittier, Henry Wadsworth Longfellow, Edmund Clarence Stedman, Richard Watson Gilder, John Hay, Edward R. Sill, Bayard Taylor and Celia Thaxter included in this work are reprinted by permission of, and by special arrangement with, Houghton Mifflin Company, the authorized publishers of the Works of these authors. The poems by Robert Louis Stevenson, Eugene Field, Mary Mapes Dodge, Richard Henry Stoddard and Henry Van Dyke included in this work are printed by permission of Charles Scribner's Sons.



CONTENTS OF THIS VOLUME

This is a short guide only to the principal contents of this volume. It is not possible to give the titles of all the Poems and Rhymes, Legends, Problems, colour pages, questions in the Wonder Book, and many other things that come into the volume; but in all cases are given the pages where these parts of our book begin. The full list of these things comes into the big index to the whole work.

PAGE

THE BOOK OF THE UNITED STATES

Chicago, the Wonder City 5513
Digging the Panama Canal . . . 5631
Knickerbocker Days 5533

THE BOOK OF FAMILIAR THINGS

Making Iron and Steel 5537
The Wonderful Tomb of King Mausolus 5566
How an Elevator Goes Up and Down 5576
Men Beneath the Waters . . . 5585
Two Famous Old Cities of North America 5612
Riding on Wheels of Air . . . 5677
The Oldest City in the United States 5684
The Box that Speaks to Us . . . 5695
What Lies Behind Your Pen . . 5731
How a Rifle Fires Twelve Bullets . 5800

THE BOOK OF WONDER

Why Do We Worry? 5573
What Is Verdigris? 5575
Does Sympathy Help Us? . . . 5639
What Causes Malaria? 5641
What Makes a Headache? . . . 5643
Why Have Some People More Beautiful Voices than Others? . . . 5644
Why Are Saints Drawn with Halos? . 5650
How High Can Men Fly? . . . 5685
Why Does a Kite Keep in the Air? . 5688
How Did the Miner Get His Lamp? . 5787
How Did Men First Learn to Fly? . 5788
Can a Dog Reason? 5790

See index for full list of questions.

THE BOOK OF NATURE

Unknown Animals 5567
American Trees in Summer . . . 5621
When Man Meets Beast . . . 5723
The Homes of the Birds . . . 5777

THE BOOK OF MEN AND WOMEN

D'ye Ken John Peel 5493
Jenny Lind, the Queen of Song . . 5495
The Gloomy King of Spain . . . 5498
What Confucius Thought . . . 5579
The Life of Confucius 5580
What Confucianism Means . . . 5581

PAGE

Some Sayings of Confucius . . . 5584
Cleopatra of the Nile 5703
The Story of Lord Lister . . . 5751
The Mother of Thomas à Becket . . 5757
The Man Who Never Was a Boy . 5758
A Thinker on a Throne . . . 5795
The Sayings of Marcus Aurelius . . 5797

THE BOOK OF CANADA

Mineral Resources 5599
Maritime Provinces 5601
Canadian Rockies and Beyond . . 5607

THE BOOK OF OUR OWN LIFE

The House That Jack Has . . . 5761

THE BOOK OF GOLDEN DEEDS

How Regulus Went Back to Die . . 5511
The Boy Who Died for the Republic 5512
Brave Grizel Hume 5615
The Man Who Loved the House . . 5618

THE STORY OF FAMOUS BOOKS

Sesame and Lilies 5501
Short History of the English People . 5502
Gladiator's Appeal 5505
Life and Voyages of Christopher Columbus 5506
Cricket on the Hearth 5508
In the Days of the Comet . . . 5509
Ninety-Three 5593
Journal of the Plague Year . . . 5596
Castle on the Cliff 5597
Waiting for Shakespeare . . . 5745

THE BOOK OF STORIES

Story of a Water Nymph . . . 5518
Fables of Æsop, the Slave . . . 5520
The King's Guest 5651
The Wonderful Book 5652
Proverb Stories 5654
The Hundred Thousand Monkeys . 5655
The Kaffir and the Lion . . . 5656
The Search for a Happy Man . . 5689
A Tale of a Shop Window . . . 5691
The Boy Who Lost His Shadow . . 5693
The Man Who Drove Downstairs . 5694

PAGE

THE BOOK OF POETRY

Cane-bottomed Chair 5613
What Every Wise Child Should Do . 5614
The Deserted Village 5739
To a Butterfly 5742
The Two Lives 5742
St. John Baptist 5742
Little Verses 5614, 5743

THE BOOK OF ALL COUNTRIES

Japan, Land of the Rising Sun . . 5557
Among the Snow-capped Alps . . 5669
Hungary, the Land of a Thousand Years 5711
Life in Australia To-day . . . 5765
The Little Brown Children . . . 5774
What I Saw in Rome 5801

THINGS TO MAKE AND TO DO

How to be Your Own Magician

The Mystery of the Suspended Knife 5658
Some Clever Balancing Feats . . 5659
Cards that Tell Any Number Thought Of 5660
The Dancing Dwarf Illusion . . . 5667

Miscellaneous

Making an Outline Portrait . . . 5521
Robin Hood and His Merry Men. *A Play* 5522
The Right Way to Do Simple Things 5523
Mistakes Made Every Day . . . 5524
Little Black Tangrams 5525
PAGE
How to Work English Embroidery . 5526
Games to Play on the Beach . . . 5527
Telephone a Boy Can Make . . . 5528
A Little Picture on Canvas . . . 5529
How to Make a Blackboard . . . 5530
When Did You Last See Your Father? *A Play* 5531
How to Make a See-Saw . . . 5657
How to Feel the Pressure of the Air . 5660
Verses Made with Figures and Letters 5661
Curious Ways of Peeling an Orange . 5662
A Filter that a Boy Can Make . . 5662
How to Make a Moving Panorama Show 5663
An Easily Made Weather-Vane . . 5664
A Little Boat that Moves in the Water 5664
A Pretty Needlework Bag . . . 5665
A Fern Basket for a Nickel . . . 5665
Hints and Tricks for Odd Moments . 5666
The Mysterious Jacob's Ladder . . 5667
Amusement with Stops and Commas . 5668

Problems

Puzzles of the Wizard King . . 5530
Game of What It Is 5530
What Games Do These Pictures Represent? 5530

SCHOOL LESSONS

Reading

Meaning of Common Abbreviations . 5645
Foreign Words and Phrases . . . 5698

COLORED PLATES

Chieftains of a Vanishing Race *Frontispiece*
Lion and the Unicorn 5614
Hush-a-bye Baby 5615

THE VILLAGE OF RUTHWAITE, WHERE JOHN PEEL LIVED FOR MANY YEARS

D'YE KEN JOHN PEEL?

CONTINUED FROM PAGE 5470.

A WISE man once said that, if he were allowed to make all the songs, he would not care who should make the laws of the nation. He meant by that, of course, that people like to have fine thoughts and high ambitions expressed in songs which they can sing, and that they believe what they sing; therefore, if we had all the people singing fine songs, their opinions would be right, and, their opinions being right, they would be bound to get good and wise laws made for themselves. There is a great deal of truth in this idea.

JOHN PEEL

But we cannot make songs to order, not good songs, at any rate. All the great songs which live have been composed with something more in the hearts of the men who wrote them than the mere desire to make a successful song. Therefore, as inspiration comes to all sorts and conditions of men, we find the songs of nations proceeding from the most unexpected quarters. The grand old song "John Peel" is an instance of this. It is a song which has sounded throughout the world wherever English is spoken. Millions of people sing it who regard the song as only the creation of a poet's brain, never imagining that the song had any relation to fact. The truth is that the song about John Peel describes a real John Peel, the real feats and character of an actual man. It is well worth while getting to know this hero of one of the greatest British songs. The real John Peel was a great, powerful Cumberland yeoman farmer, who was born in 1776, at Caldbeck, Cumberland, and grew to hardy manhood among the lakes and mountains which had long been the home of his family. We may not think a man a great hero whose chief passion was the hunting of animals, but there was something in the nature of John Peel which has been in the nature of all the great Englishmen who have carried the British flag to the ends of the earth. He was bold and fearless; the ways of Nature were as an open book to him; he knew all the country round, as a Red Indian knows his native woods. He waged war continually against the fox, which at that time did great damage to the Cumberland farmers' flocks. In order to do so, he organised a hunt. He trained dogs to help him, and there was no chase too far, nor way too rough or dizzy, for him and them to follow the fox to his hiding-place.

JOHN PEEL'S HOUSE AT RUTHWAITE

Although he was only a humble farmer, Peel's fame as a hunter spread far and wide, and squires and nobles were proud to join with the farmers in following his lead. One of his closest friends was a man named John Woodcock Graves, who, born at Wigton, Cumberland, in 1795, went as a young man to Caldbeck, and there set up a woollen manufactory. He hunted regularly with Peel, and in the evenings they would meet and talk over the day's hunt, and arrange matters for the following day's proceedings.

On one such night, as the two friends were thus engaged, with a cheery fire burning in the grate, and the wind howling and the snow falling outside, they heard a voice singing an old song. It was the voice of John Graves's mother, hushing his baby-boy to sleep with a favourite old Cumberland ballad called "Bonnie Annie." The two men mused over the comfortable fire, and the melody wove itself into the mind of Graves, and seemed to set itself to the doings of Peel in the hunt. And there and then Graves took the pen and paper which they had been using for writing down the record of the hunt, and wrote the song "John Peel." When he had written it, he sang it to the tune of "Bonnie Annie" to John Peel, down whose face the tears streamed as he listened to the fine, stirring words. In that manner this immortal song was born that winter night in the little parlour of that house in Caldbeck. Neither could guess what fame the song was to gain, but Graves, after he had sung the words to Peel, looked up and said, half in jest, yet perhaps a little realising that he had performed a miracle: "You will be sung, John, when you and I have run to earth."

It was the hunting men of Cumberland who spread the song, and soon the stirring words were heard all over England:

D'ye ken John Peel, with his coat so grey?
D'ye ken John Peel at the break of the day?
D'ye ken John Peel when he's far, far away,
With his hounds and his horn in the morning?
'Twas the sound of his horn call'd me from my bed,
And the sound of his horn has me oft-times led;
For Peel's view-halloo would awaken the dead,
Or a fox from his lair in the morning.

It was to the tune of the old song "Bonnie Annie" that the song first became known, but it was with the tune by which we sing it to-day, Metcalfe's tune, that it has become world-famous. It was some time about 1830 when Graves wrote the song, and though he emigrated in 1833 to Tasmania, he lived to know that the words written in honour of John Peel had become known and beloved throughout the English-speaking world, and to hear that the song was sung

CALDBECK CHURCHYARD, WHERE JOHN PEEL IS BURIED

at theatres in London, in the trenches where the army fought in the Crimea, in the royal palace at home, where it was the favourite hunting-song of King Edward VII. Graves died in 1885, father of a numerous family. Peel died in 1854, and was followed to his grave by a great gathering of admirers. He hunted until within a week of his death, riding as well at seventy-six as a man half his age.

His life was like that of some character in an old novel. A giant in build, he had something of the determination of a giant. As a young man, he fell in love with a bonnie lassie named Mary White, the daughter of a well-to-do farmer at Uldale, and, without asking anybody's leave, he had the banns published at church. But Mary's mother was there, and was shocked. She stood up in church, and cried out : " They're far ower young ! " and the marriage was delayed. But John took his best horse, rode off to his sweetheart's house, and carried her away at dead of night, and married her at break of day. Then he returned to his father's house to say : " We're married." And that was all about it, except that they immediately got married a second time in church. It proved the happiest of marriages ; and the eldest of his family of thirteen children, young John, became almost as famous a hunter as the splendid hero of our song had been.

JENNY LIND, THE QUEEN OF SONG

THERE is a house which has a famous room in it, called " The Nightingale's Cage," and for many years that house was the home of an old lady who was known to the world as Jenny Lind, " the Swedish Nightingale." Our grandfathers and grandmothers tell us how Jenny Lind became the Queen of Song ; how millions of people in Europe and America crowded to hear her sing ; how kings and queens and the greatest men and women of the day adored this quiet, shy woman with the wonderful voice.

One night when she had been driven to the Opera in New York, her coachman said to the crowd : " This is the hand that drove her. Half a dollar a kiss." And people actually paid the money to kiss her coachman's hand. Men and women starved themselves so that they might have the money to pay for a ticket for a concert where Jenny Lind was singing. Never before, or since, has any singer won so great a fame. And yet, through it all, Jenny Lind remained perfectly simple, and modest, and sweet. If she had had only a marvellous voice, Jenny Lind would have been almost forgotten to-day. But she had a lovely character, and that has kept her memory alive. When she was at Manchester she called at the Blind Asylum. The people there did not know who she was, but she sat down and talked to the blind girls. Presently she said to them : " Would you like me to sing to you ? " In a few moments — so exquisitely did she sing—they were all whispering : "This must be Jenny Lind ! " The tears streamed down the faces of the poor girls as she sang, one after another, the songs they knew and loved. Jenny Lind made a fortune by her singing, but she was always helping the poor and sick. In Norwich and in London there are hospitals to which she handed thousands of pounds. Nothing could give her greater pleasure and happiness than to sing to the suffering and sad. Dean Forrest, of Worcester, was preaching one day in a London church, when Jenny Lind—then an old lady—came into the vestry to thank him for the sermon. He told her that, not long before, he had been

JENNY LIND AT THE PIANO

visiting a dying man who had heard Jenny Lind sing her great air, "I know that my Redeemer liveth." The man said his whole life had been altered by that song. When we go to Westminster Abbey we should look out for the memorial to Jenny Lind. It is near Poets' Corner, and on it we can read the words: "I know that my Redeemer liveth."

Jenny Lind, who was a native of Sweden, was born in 1820, and she began singing in opera when she was seventeen. She made a sensation in Dresden in 1844. She went at last to London, and people went almost crazy about this slim girl with the marvellous voice. Queen Victoria went again and again to hear her, and wrote in her diary: "There is a purity in her singing and acting which is quite indescribable." Every night when Jenny Lind was singing the Opera House was packed, and her coming and going were treated as if she were indeed a queen. All this enthusiasm never made her proud. She wrote to Professor Blackie: "My increasing prayer is that what I gave to my fellows may continue to live on through eternity, and that the Giver of the gift, and not the creature to whom He lent it, may be praised and acknowledged."

THE ROOM WHERE JENNY LIND OFTEN MET MENDELSSOHN
It was in the house of a friend of both the great musicians

Decorations and honours were showered on her by the monarchs of Europe, but she continued to be the same simple-hearted woman she had been before the world discovered her lovely voice. The other day an American lady, who was looking at her memorial in the Abbey, gave this little reminiscence of Jenny Lind. "I heard her sing in Boston more than fifty years ago. On the following day she sought shelter in our house in a storm of rain. She had been riding and was very wet. My mother made tea for her, and while the weather was clearing she offered to sing to us. Just imagine how charmed we were to hear Jenny Lind all to ourselves! She left her riding-whip behind her, and when I ran out to give it to her she gave me a little scent-bottle. She was a sweet woman, full of gentleness, and I treasure that little gift to this day."

It was a great surprise when Jenny Lind left the stage, never to sing in opera again. This is the story of why she took this step, at the height of her popularity, and when great sums were being paid to her. An English friend found her sitting on the sands. She had a Bible open on her knee, and was looking out into the glory of a sunset that was shining over the sea. They talked, and the talk drew near to the inevitable question, "Oh, madame, how was it that you ever abandoned the stage at the very height of your success?"

Jenny Lind gave this memorable reply: "When every day it made me think less of this"—laying her finger on the Bible—"and nothing at all of that"—pointing to the sunset—"what else could I do?"

So, very quietly, the Swedish Nightingale left the opera, and devoted the rest of her career to singing in oratorios or rendering the ballads which she had always loved best. She went to Tennyson's home in the Isle of Wight once, and this is the record of her visit: "Jenny Lind came to Farringford and sang 'Auld Lang Syne' and 'Auld Robin Gray' for Tennyson at his special request. She sang Handel and some of the 'Elijah' magnificently. She is full of feeling and of fun, and is deeply religious."

There was another great singer, Mr. Sims Reeves, before the public at the same time as Jenny Lind, and one day, when these two were to sing together, they were seen pacing up and down the room, with music in hand, singing and practising, intent on the work before them.

"Why, Jenny," said her husband, "you must have sung those songs many times. Surely there is no need for all this practising?" The singer answered her husband: "You are a fine musician, but Mr. Reeves and I are singers, and we know what is best for us."

Up to the very last of her public performances she took the utmost trouble to practise before she sang.

Nothing is more astonishing about the career of Jenny Lind than its comparative shortness. She sang in opera in England for only two years, yet in that time she electrified the musical world. Twice Queen Victoria threw bouquets to the singer, an honour she never paid to anyone else. She retired practically five years after her first appearance in London, though she sang occasionally during the next few years, usually on behalf of charity.

Having married Mr. Otto Goldschmidt, she still took a keen interest in music, and attended the rehearsals of the Bach Choir, which he conducted. The writer has seen Jenny Lind singing in the choir, while the audience was quite unaware that the gentle lady in black silk was the songstress who had enchanted millions with her wonderful voice. Members of the Royal Family delighted to visit Madame Goldschmidt in her country home, and sometimes she would be persuaded to sing once more the music of the past. There was a fine dignity about her which marked her out as one of the world's truly great women. She attended concerts where new singers were appearing, and no one was more generous than she in praising them. Adelina Patti tells how, one afternoon at a party, she was complimented in a most discriminating way by a charming old lady, whom, to her amazement, she afterwards found to be Jenny Lind.

During her career, when she was receiving enormous fees for singing, Jenny Lind distributed a great part of her wealth among hospitals in her native land of Sweden and in her adopted country of England. To hospitals in Norwich and London she made splendid gifts which keep her memory sweet to this day. She was specially interested in Norwich, because she was the friend of the bishop. One of the sons of the Bishop of Norwich has left on record an account of how he hung over the staircase as a lad, greatly excited, to watch the arrival of the wonderful singer one evening.

A little child who had heard Jenny Lind described as "a perfect angel," asked the singer very naturally: "Where do you keep your wings, please?" When, some years after her death, the memorial to Jenny Lind was unveiled by Princess Christian in Westminster Abbey, a very pretty surprise took place The organist played a selection from the oratorio "Ruth," which was composed by Mr. Otto Goldschmidt, Jenny Lind's husband. The old composer was present in the Abbey, and the sound of his own music touched him very much. One of Jenny Lind's lifelong friends was Hans Christian Andersen, the writer of the delightful fairy-stories. She admired his genius, and used to read his stories to her own children.

JENNY LIND AT THE HEIGHT OF HER FAME

In November, 1887, Madame Goldschmidt passed away, and a long procession, headed by representatives of Queen Victoria and the Royal Family, wound its solemn way to Great Malvern cemetery. There she rests, with the words she had sung so thrillingly inscribed on her tomb: "I know that my Redeemer liveth." Lovely as her wonderful voice was, her life had been fairer still. By the nobility and generosity of her disposition she won for herself, in the public esteem, a position such as no other singer has ever obtained.

Copyright, 1910, H. C. White Co.

The Alhambra, Spain

THE GLOOMY KING OF SPAIN

No gloomier, more bigoted, or more cruel sovereign ever sat upon a European throne than Philip II. of Spain, the husband of Mary of England. With a magnificent empire extending over two hemispheres, revenues such as no monarch had before enjoyed, armies composed of the pick of the world's soldiers, led by the most brilliant generals, and a splendid navy, Philip was, nevertheless, the most miserable man of his time; and before he passed away he saw the failure of all his plans of ambition—failure that was the result solely of his own bitter intolerance and cruelty and obstinacy.

His father, the Emperor Charles V., of whom we read on another page, had given him ideas of universal empire, but he was less able to achieve such an ambition than was Charles; and although he fought great wars in Europe to get glory and power—and, above all, to make all his subjects conform to his own religious views—it is a cause for much satisfaction that he failed.

In Spain, Philip's great and lasting monument—a monument that is typical of the man himself—is the Escurial, a great building about twenty-five miles from Madrid, which was erected to be a palace, a monastery, and a tomb all in one. Charles V. had urged upon his son to provide a suitable resting-place for his remains, and when Philip won the great battle of St. Quentin against the French in 1557 he made a vow to erect a great monastery and palace where his father's bones should rest, and to dedicate it to St. Lawrence.

Philip was a most superstitious man, and he had the Escurial designed in the form of a gridiron, because St. Lawrence is said to have perished by martyrdom upon a gridiron. The plan is certainly the strangest of any great building in the world. Fabulous wealth was expended upon it, and it was not without reason that the Escurial was called in Spain "the eighth wonder of the world." For thirty years Philip devoted most of his spare time to visiting the mountains north-west of Madrid, where, 2,700 feet above the sea, he had selected a more or less inaccessible site for his monastery-palace. There he would sit or stand and watch the great palace gradually rising, as thousands of workmen built up the massive walls. In order to judge the effect from a distance, Philip would climb to a rocky crag a mile or more from the building,

THE ESCURIAL PALACE, NEAR MADRID

and in a kind of natural chair formed by the granite-like rock, which ever since has been known as "the king's seat," he would sit for hours, with a spy-glass, gazing upon the wonderful palace that was being erected.

To this spot the monarch used to bring his secretaries and his papers, and from there keep up a correspondence with the different parts of his great empire. An old writer tells us that he did four times the amount of work there that he did in the same number of days in his capital. Philip himself used to boast that, thus hidden from the world, with a little bit of paper, he ruled over both hemispheres.

PHILIP II. SEATED ON THE ROCK FROM WHICH HE WATCHED THE BUILDING OF THE ESCURIAL

Upon the decoration of the Escurial, and in pictures for its walls, Philip spent an enormous amount of money. He employed Titian and all the most famous Italian artists of the day, and some of their most brilliant works were the results of Philip's patronage. He was a gifted art critic himself, and was most exacting in his requirements, so that some of the artists had to do their work over and over again before they could satisfy the king. One of them, Zuccaro, who had been greatly overrated, failed to satisfy him at all, and he was dismissed back to his own country. But Philip always treated his artists generously with money, and when this unlucky painter was sent away he was paid a large sum, in addition to a handsome salary for the full length of time for which he had been engaged.

"It is not Zuccaro's fault," said Philip; "it is the fault of the persons who brought him here." The king would sit for hours watching the artists at work, offering occasional criticisms and talking familiarly with them, In fact, it has been said that in the presence of this great building Philip's nature appeared to expand.

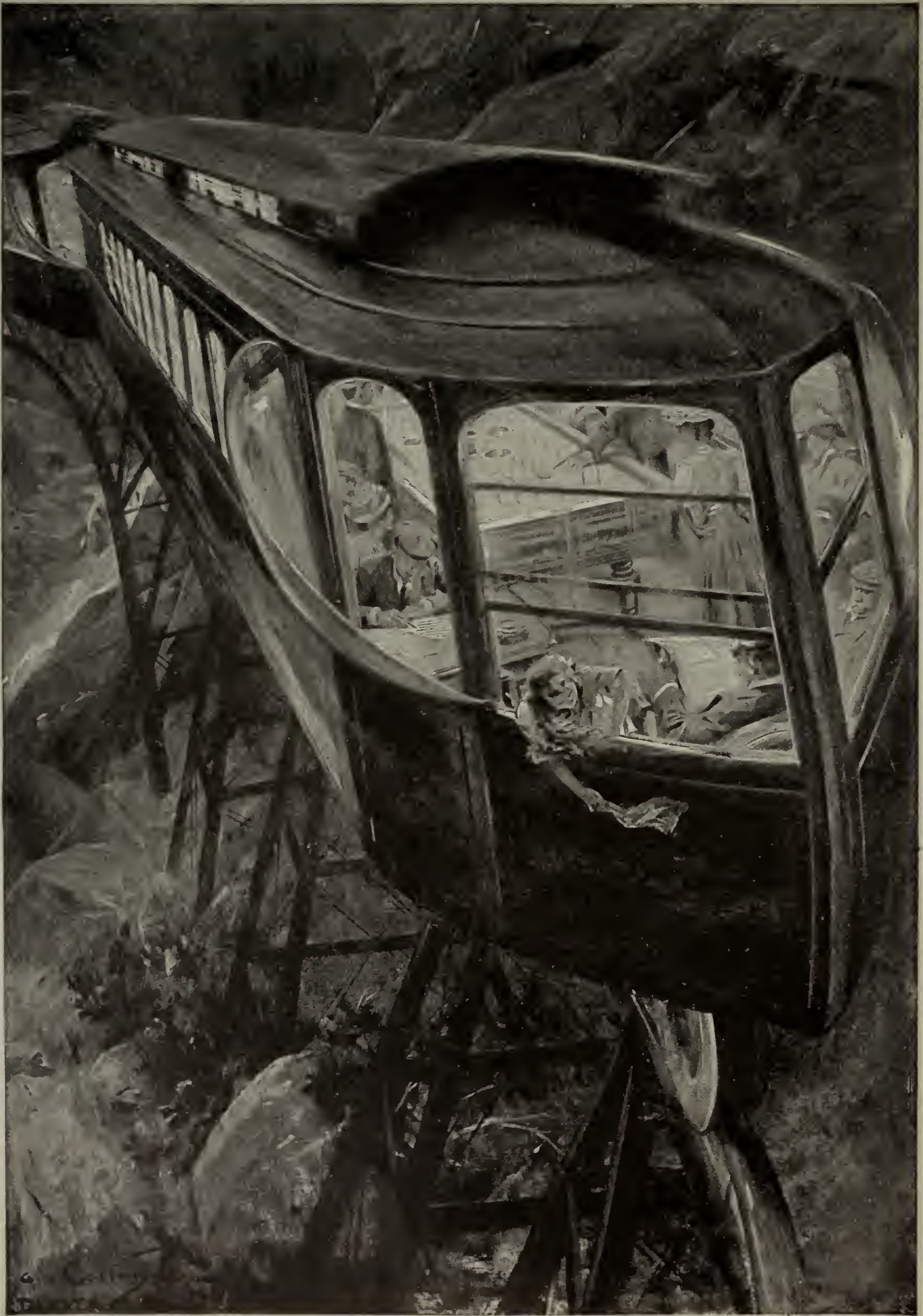
When the palace was far advanced, after the building operations had been going on for fourteen years, it was one night struck by lightning, and a fire broke out that came near to destroying it. Philip watched the fire with great anxiety, but at last it was subdued. Twenty-one years after the foundation-stone was laid the building was completed, and it is safe to say that no other building of such great proportions has ever been built in so short a time.

The Escurial is now slowly becoming a ruin. It has lost its ancient glory—if such a gloomy place could be said to have a glory—and is no longer inhabited, except for a part which is now used as a school.

When it was finished the Escurial was more than half a mile round, and had no fewer than sixty-eight fountains playing in its halls and courts. There were twelve thousand windows and doors, and the keys of the doors weighed more than half a ton. Philip died in the Escurial palace in 1598, and his remains lie buried there.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 5579.

THE WONDERFUL TRAIN THAT IS COMING



In this picture we have a vivid and realistic picture of what the railway of the future will be like. Remarkable results must follow the invention of the "gyroscope" train, which is the application to the railway of that interesting toy, the gyroscope, which all boys know is the most wonderful of tops. Exhaustive experiments have already been made with a large car, and the "gyro-car," that runs on a single rail, has fulfilled all that its inventor expected of it and claimed for it. Not only will enormous speeds be reached by trains of this kind, but the gyroscopes will keep the train so steady that we shall be able to write while travelling, or even to play billiards.

The works of John Ruskin, the great English philosopher, have all strange titles. "Sesame and Lilies" is the name of his book from which the following passage on "The Good and Happy Girl" is taken. Sesame was a plant deemed by the Arabs in ancient times to have certain magic power, particularly in the opening of doors. Probably that was why the door of the cave rolled open to the leader of the Forty Thieves, and afterward to Ali Baba, when the words "Open, Sesame!" were spoken. Ruskin's essays or lectures in this book called "Sesame and Lilies" are concerned with the education of boys and girls. The boys are supposed to be the openers of doors, in the sense of growing up to fight their fortunes in many different walks of life; and the lily is one of the oldest symbols for the good girl, or woman. The language of Ruskin, though dignified and weighty in style, is still simple and perfectly expressive of his thoughts, so that it can be read by young people with understanding.

A GOOD & HAPPY GIRL—By JOHN RUSKIN

Do not think you can make a girl lovely if you do not make her happy. There is not one restraint you put on a good girl's nature, there is not one check you give to her instincts of affection or of effort, which will not be indelibly written on her features with a hardness which is all the more painful because it takes away the brightness from the eyes of innocence and the charm from the brow of virtue.

The perfect loveliness of a woman's countenance can only consist in that majestic peace which is founded in the memory of happy and useful years, full of sweet records; and from the joining of this with that yet more majestic childishness, which is still full of change and promise, opening always, modest at once, and bright with hope of better things to be won, and to be bestowed. There is no old age where there is still that promise.

Thus, then, you have first to mould her physical frame, and then, as the strength she gains will permit you, to fill and temper her mind with all knowledge and thoughts which tend to confirm its natural instincts of justice, and refine its natural tact of love.

All such knowledge should be given her as may enable her to understand, and even to aid, the work of men; and yet it should be given, not as knowledge—not as if it were, or could be, for her an object to know, but only to feel, and to judge. It is of no moment, as a matter of pride or perfectness in herself, whether she knows many languages or one; but it is of the utmost that she should be able to show kindness to a stranger, and to understand the sweetness of a stranger's tongue. It is of no moment to her own worth or dignity that she should be acquainted with this science or that; but it is of the highest that she should be trained in habits of accurate thought; that she should understand the meaning, the inevitableness, and the loveliness of natural laws; and follow at least some one path of scientific attainment, as far as to the threshold of that bitter Valley of Humiliation, into which only the wisest and bravest of men can descend, owning themselves for ever children, gathering pebbles on a boundless shore.

It is of little consequence how many positions of cities she knows, or how many dates of events, or names of celebrated persons; it is not the object of education to turn the woman into a dictionary; but it is deeply necessary that she should be taught to enter with her whole personality into the history she reads; to picture the passages of it vitally in her own bright imagination; to apprehend, with her fine instincts, the pathetic circumstances and dramatic relations which the historian too often only eclipses by his reasoning, and disconnects by his arrangement; it is for her to trace the hidden equities of divine reward, and catch sight, through the darkness, of the threads of woven fire that connect error with retribution.

CONTINUED FROM PAGE 5436.

But, chiefly of all, she is to be taught to extend the limits of her sympathy with respect to that history which is being for ever determined as the moments pass, in which she draws her peaceful breath; and to the contemporary calamity which, were it but rightly mourned by her, would recur no more hereafter. She is to exercise herself in imagining what would be the effects upon her mind and conduct if she were daily brought into the presence of the suffering which is not the less real because shut from her sight. She is to be taught somewhat to understand the nothingness of the proportion which that little world in which she lives and loves bears to the world in which God lives and loves; and solemnly she is to be taught to strive that her thoughts of piety may not be feeble in proportion to the number they embrace, nor her prayer more languid than it is for the momentary relief from pain of her husband or her child, when it is uttered for the multitudes of those who have none to love them, and is "for all who are desolate and oppressed."

THE DEATH OF A QUEEN—By JOHN RICHARD GREEN

John Richard Green was one of the greatest historians who have ever attempted to tell the whole story of England's progress from earliest times to the making of the empire of which Englishmen are so proud to-day. Such an immense task requires the rarest gifts of mind, the widest knowledge, great power of expression, and industry unlimited. All these Green possessed, and yet he was physically weak, stricken, indeed, with consumption, so that the closing chapters of his great history were spoken by him from his sick-bed and written down by his wife, who afterwards became famous herself as a historian, and is still an active writer. In this passage from Green's "Short History of the English People" we have a fine example of the historian's restrained yet dramatic power of presenting a great scene from history—the death of Queen Elizabeth. He imparts a wonderful sense of the loneliness of her death, and the contrast it presented with the display and glitter of her life. It is at once a striking picture of a great woman, and a lesson in the vanity of royal pomp, for the favour of a people does not last for ever, and even kings and queens are but creatures of a day.

THE triumph of Mountjoy flung its lustre over the last days of Elizabeth, but no outer triumph could break the gloom which gathered round the dying queen. Lonely as she had always been, her loneliness deepened as she drew near the grave.

The statesmen and warriors of her earlier days had dropped one by one from her council-board, and their successors were watching her last moments, and intriguing for favour in the coming reign. Her favourite, Lord Essex, was led into an insane outbreak of revolt which brought him to the block. The old splendour of her court waned and disappeared. Only officials remained about her, "the other of the Council and nobility estrange themselves by all occasions."

As she passed along in her progresses, the people whose applause she courted remained cold and silent. The temper of the age, in fact, was changing, and isolating her as it changed. Her own England which had grown up around her, serious, moral, prosaic, shrank coldly from this brilliant, fanciful, unscrupulous child of earth and the Renaissance.

She had enjoyed life as the men of her day enjoyed it, and now that they were gone she clung to it with a fierce tenacity. She hunted, she danced, she jested with her young favourites, she coquetted and scolded and frolicked at sixty-seven as she had done at thirty. "The queen," wrote a courtier a few months before her death, "was never so gallant these many years, nor so set upon jollity." She persisted, in spite of opposition, in her gorgeous progresses from country house to country house. She clung to business as of old, and rated in her usual fashion "one who minded not to giving up some matter of account." But death crept on. Her face became haggard, and her frame shrunk almost to a skeleton.

At last her taste for finery disappeared, and she refused to change her dresses for a week together. A strange melancholy settled down on her; "she held in her hand," says one who saw her in her last days, "a golden cup, which she often put to her lips; but in truth her heart seemed too full to need more filling."

Gradually her mind gave way. She lost her memory, the violence of her temper became unbearable, her very courage seemed to forsake her. She called for a sword to lie constantly beside her, and thrust it from time to time through the arras as if she heard murderers stirring there. Food and rest became alike distasteful. She sat day and night propped up with pillows on a stool, her fingers on her lip, her eyes fixed on the floor, without a word. If she once broke the silence, it was with a flash of her old queenliness. When Robert Cecil asserted that she *must* go to bed, the word roused her like a trumpet. "Must!" she exclaimed; "is *must* a word to be addressed to princes? Little man, little man, thy father, if he had been alive, durst not have used that word."

Then, as her anger spent itself, she sank into her old dejection. "Thou art so presumptuous," she said, "because thou knowest I shall die." She rallied once more when the Ministers beside her bed named Lord Beauchamp, the heir to the Suffolk claim, as a possible successor. "I will have no rogue's son," she cried hoarsely, "in my seat."

But she gave no sign, save a motion of the head, at the mention of the King of Scots. She was, in fact, fast becoming insensible, and early the next morning the life of Elizabeth, a life so great, so strange and lonely in its greatness, passed quietly away.

THE LAST HOURS OF QUEEN ELIZABETH: FROM THE FAMOUS PICTURE BY PAUL DELAROCHE

THE GLADIATOR'S APPEAL TO HIS COMRADES

Spartacus, a famous gladiator in ancient Rome, was the leader in a great revolt against the Roman power that broke out about 73 years before Christ was born. With hordes of runaway slaves, who at one time numbered a hundred thousand, he passed from victory to victory, almost overrunning Southern Italy. At last his army was annihilated, and Spartacus was slain. Here we see him urging his fellow-gladiators to turn upon their masters.

THE GLADIATOR'S APPEAL

In the days of imperial Rome the favourite pastime of the people was to watch the gladiators fighting each other, or combating with wild beasts in the arenas. Every Roman city had its arena where these fights took place. The gladiators were slaves, chiefly captured in battle, and specially trained for the arena, where, sooner or later, they were doomed to be killed. Many Greeks were among these fighting slaves, and Spartacus was a Greek who, seventy-three years before the birth of Christ, incited his fellow-gladiators to revolt against their brutal Roman oppressors. For nearly three years he resisted the Roman power, defeating various armies sent against him, but at last he was killed, and his followers dispersed. An American author, Elijah Kellogg, has imagined how Spartacus first addressed his fellow-slaves in this speech, which is a favourite recitation in America.

YE call me chief; and ye do well to call him chief who for twelve long years has met upon the arena every shape of man or beast the broad Empire of Rome could furnish, and who never yet lowered his arm. If there be one among you who can say that ever in public fight or private brawl my actions did belie my tongue, let him stand forth and say it. If there be three in all your company dare face me on the sands, let them come on. And yet I was not always thus—a hired butcher, a savage chief of still more savage men. My ancestors came from old Sparta, and settled among the vine-clad rocks and citron groves of Syrasella.

My early life ran quiet as the brooks by which I sported; and when, at noon, I gathered the sheep beneath the shade, and played upon the shepherd's flute, there was a friend, the son of a neighbour, to join me in the pastime. We led our flocks to the same pasture, and partook together our rustic meal. One evening, after the sheep were folded, and we were all seated beneath the myrtle which shaded our cottage, my grandsire, an old man, was telling of Marathon and Leuctra; and how, in ancient time, a little band of Spartans, in a defile of the mountains, had withstood a whole army.

I did not then know what war was; but my cheeks burned, I know not why, and I clasped the knees of that venerable man, until my mother, parting the hair from off my forehead, kissed my throbbing temples, and bade me go to rest, and think no more of those old tales and savage wars. That very night the Romans landed on our coast. I saw the breast that had nourished me trampled by the hoof of the war-horse—the bleeding body of my father flung amid the blazing rafters of our dwelling! To-day I killed a man in the arena; and when I broke his helmet-clasps, behold! he was my friend. He knew me, smiled faintly, gasped, and died—the same sweet smile upon his lips that I had marked when, in adventurous boyhood, we scaled the lofty cliff to pluck the first ripe grapes, and bear them home in childish triumph!

I told the prætor that the dead man had been my friend, generous and brave; and I begged that I might bear away the body, to burn it on a funeral pile, and mourn over its ashes. Ay, upon my knees, amid the dust and blood of the arena, I begged that poor boon, while all the assembled maids and matrons, and the holy virgins they call Vestals, and the rabble, shouted in derision, deeming it rare sport, forsooth, to see Rome's fiercest gladiator turn pale and tremble at sight of that piece of bleeding clay! And the prætor drew back as if I were pollution, and sternly said, "Let the carrion rot, there are no noble men but Romans!" And so, fellow-gladiators, must you, and so must I, die like dogs.

O Rome! Rome! thou hast been a tender nurse to me. Ay, thou hast given to that poor, gentle, timid shepherd lad who never knew a harsher tone than a flute-note muscles of iron and a heart of flint: taught him to drive the sword through plaited mail and links of rugged brass, and warm it in the marrow of his foe—to gaze into the glaring eyeballs of the fierce Numidian lion even as a boy upon a laughing girl!

And he shall pay thee back, until the yellow Tiber is red as frothing wine, and in its deepest ooze thy life-blood lies curdled!

Ye stand here now like giants, as ye are. The strength of brass is in your toughened sinews. By to-morrow some Roman Adonis, breathing sweet perfume from his curly locks, shall with his lily fingers pat your red brawn, and bet his sesterces upon your blood Hark! Hear ye yon lion roaring in his den? 'Tis three days since he has tasted flesh; but to-morrow he shall break his fast upon yours—and a dainty meal for him ye will be! If ye are beasts, then stand here like fat oxen, waiting for the butcher's knife! If ye are men, follow me!

Strike down yon guard, gain the mountain passes, and there do as did your sires at old Thermopylæ! Is Sparta dead? Is the old Grecian spirit frozen in your veins, that you do crouch and cower like a belaboured hound beneath his master's lash? O comrades! warriors! Thracians! if we must fight, let us fight for ourselves! If we must slaughter, let us slaughter our oppressors! If we must die, let it be under the clear sky, by the bright waters, in noble, honourable battle!

COLUMBUS SEES AMERICA: By WASHINGTON IRVING

In all the stories of the deeds of men, none are more thrilling than those of the first bold adventurers who have sailed into unknown seas and discovered strange lands and peoples. The story of how Columbus discovered America will never be forgotten as long as America lasts and mankind endures upon the mighty continent of our Western world. This story has been told by countless writers, but it is surely a remarkable thing that the best of all the descriptions of this great event in the history of the world is from the pen of an American. Washington Irving was the first great writer born in the land which Columbus discovered. It was while staying at Madrid that he completed a great book on Columbus in 1828, and from this the following passage has been taken:

THE situation of Columbus was daily becoming more and more critical. In proportion as he approached the regions where he expected to find land the impatience of his crews augmented. The favourable signs which increased his confidence was derided by them as delusive, and there was danger of their rebelling and obliging him to turn back when on the point of realising the object of all his labours. They beheld themselves with dismay still wafted outward, over the boundless wastes of what appeared to them a mere watery desert surrounding the habitable world.

There was imminent danger of their breaking forth into open rebellion, and compelling Columbus to turn back. In their secret conferences they exclaimed against him as a desperado, bent, in a mad fantasy, upon doing something extravagant to render him notorious. What obligations bound them to continue on with him, or when were the terms of their agreement to be considered as fulfilled? They had already penetrated unknown seas, untraversed by a sail, far beyond where man had ever before ventured. How much farther were they to go in quest of a merely conjectured land? Were they to sail on until they perished, or until all return became impossible?

On the other hand, should they consult their safety, and turn back before too late, who would blame them? Any complaints made by Columbus would be of no weight—he was a foreigner without friends or influence; his schemes had been condemned by the learned, and discountenanced by people of all ranks. He had no party to uphold him, and a host of opponents whose pride of opinion would be gratified by his failure. Or, as an effectual means of preventing his complaints, they might throw him into the sea, and give out that he had fallen overboard while busy with his instruments contemplating the stars.

Columbus was not ignorant of the mutinous disposition of his crew; but he still maintained a serene countenance.

They continued on with the same propitious breeze, tranquil sea, and mild, delightful weather. The water was so calm that the sailors amused themselves with swimming about the vessel. Dolphins began to abound, and flying fish, darting into the air, fell upon the decks. The continued signs of land diverted the attention of the crews, and insensibly beguiled them onward.

Eager to obtain the promised pension, the seamen were continually giving the cry of "Land!" on the least appearance of the kind. To put a stop to these false alarms, which produced continual disappointment, Columbus declared that, should anyone give such notice, and land not being discovered within three days afterward, he should thenceforth forfeit all claim to the reward.

The crews now sank into a degree of dejection proportioned to their recent excitement; but new circumstances occurred to arouse them. Columbus, having observed great flights of small field birds going toward the south-west, concluded they must be secure of some neighbouring land. The farther they went, the more frequent and encouraging were the signs of land. Flights of small birds of various colours, some of them such as sing in the fields, came flying about the ships, and then continued toward the south-west; and others were heard also, flying by in the night. Tunnyfish played about the smooth sea, and a heron, a pelican, and a duck were seen, all bound in the same direction. The herbage which floated by was fresh and green, as if recently from land; and the air, Columbus observed, was as sweet and fragrant as April breezes in Seville.

All these, however, were regarded by the crews as so many delusions beguiling them on to destruction; and when, on the evening of the third day, they beheld the sun go down upon a shoreless ocean, they broke forth into turbulent clamour. They exclaimed against this obstinacy in tempting fate by continuing on into a boundless sea. They insisted upon turning homeward, and abandoning the voyage as hopeless.

Columbus endeavoured to pacify them by gentle words and promises of large rewards; but finding that they only increased in clamour, he assumed a decided tone. He told them that it was useless to murmur; the expedition had been sent by the sovereigns to seek the Indies, and he was determined to persevere until, by the blessing of God, he should accomplish the enterprise.

Columbus was now at open defiance with his crew, and his situation became desperate. Fortunately, the manifestations of the vicinity of land were such, on the following day, as no longer to admit a doubt. Besides a quantity of fresh weeds, such as grow in rivers, they saw a green fish of a kind which keeps about rocks; then a branch of thorn with berries on it, and recently separated from the tree, floated by them; then they picked up a reed, a small board, and, above all, a staff artificially carved.

All gloom and mutiny now gave way to sanguine expectation, and throughout the day each one was eagerly on the watch, in hopes of being the first to discover the long-sought-for land.

In the evening, when, according to invariable custom on board of the admiral's ship, the mariners had sung the "Salve Regina," or vesper hymn to the Virgin, he made an impressive address to his crew. He pointed out the goodness of God in thus conducting them by soft and favouring breezes across a tranquil ocean, cheering their hopes continually with fresh signs, increasing as their fears augmented, and

COLUMBUS ABOUT TO SET OUT FROM PALOS FOR THE DISCOVERY OF THE NEW WORLD
This picture is reproduced from the fine painting by the great Spanish artist, Ricardo Balaca

thus guiding them to a promised land.

The greatest animation prevailed throughout the ships; not an eye was closed that night. As the evening darkened, Columbus took his station on the top of the castle, or cabin, on the high poop of his vessel, ranging his eye along the dusky horizon, and maintaining an intense and unremitting watch. About ten o'clock he thought he beheld a light glimmering at a great distance. Fearing his eager hopes might deceive him, he called to Pedro Gutierrez, gentleman of the king's bed-chamber, and inquired whether he saw such a light. The latter replied in the affirmative.

Doubtful whether it might not yet be some delusion of the fancy, Columbus called Rodrigo Sanchez, of Segovia, and made the same inquiry. By the time the latter had ascended the round-house the light had disappeared. They saw it once or twice afterward, in sudden and passing gleams, as if it were a torch in the barque of a fisherman, rising and sinking with the waves, or in the hand of some person on shore, borne up and down as he walked from house to house.

So transient and uncertain were these gleams that few attached any importance to them. Columbus, however, considered them as certain signs of land; and, moreover, that the land was inhabited. They continued their course until two in the morning, when a gun from the Pinta gave the joyous signal of land. It was first descried by a mariner named Rodrigo de Triana, but the reward was afterward adjudged to the admiral for having previously perceived the light. The land was now clearly seen about two leagues distant; whereupon they took in sail and laid-to, waiting impatiently for the dawn.

The thoughts and feelings of Columbus in this little space of time must have been tumultuous and intense. The great mystery of the ocean was revealed; his theory, which had been the scoff of sages, was triumphantly established; he had secured to himself a glory durable as the world itself.

It is difficult to conceive the feelings of such a man at such a moment, or the conjectures which must have thronged upon his mind as to the land before him, covered with darkness. That it was fruitful was evident from the vegetables which floated from its shores.

He thought, too, that he perceived the fragrance of aromatic groves. The moving light he had beheld proved it to be the residence of man. A thousand speculations must have swarmed upon him, as, with his anxious crews, he waited for the night to pass away, wondering whether the morning light would reveal a savage wilderness, or dawn upon spicy groves, and glittering fanes, gilded cities, and all the splendours of Oriental civilisation.

THE SONG OF THE KETTLE

ONE of the most beautiful stories by Charles Dickens is "The Cricket on the Hearth." It is a Christmas tale, and it was the pleasing fancy of the author to suggest that the little friendly cricket which haunted the hearth of the Peerybingles was always chirruping loudly when things were going well, but was silent in times of sadness or sorrow. The story begins with a very cosy scene, the kettle steaming on the hob, and the cricket chirruping on the hearth, as if in competition. We give here the song of the kettle.

THAT this song of the kettle's was a song of invitation and welcome to somebody out of doors, to somebody at that moment coming on towards the snug, small home and the crisp fire, there is no doubt whatever. Mrs. Peerybingle knew it perfectly, as she sat musing before the hearth. "It's a dark night," sang the kettle, "and the rotten leaves are lying by the way; and above, all is mist and darkness, and below, all is mire and clay; and there's only one relief in all the sad and murky air; and I don't know that it is one, for it's nothing but a glare of deep and angry crimson, where the sun and wind together set a brand upon the clouds for being guilty of such weather; and the wildest open country is a long dull streak of black; and there's hoar-frost on the finger-post, and thaw upon the track; and the ice it isn't water, and the water isn't free; and you couldn't say that anything is what it ought to be; but he's coming, coming, coming!"

The kettle had had the last of its solo performance. It persevered with undiminished ardour; but the cricket took first fiddle, and kept it. Good heaven, how it chirped! Its shrill, sharp, piercing voice resounded through the house, and seemed to twinkle in the outer darkness like a star.

There was an indescribable little trill and tremble in it, at its loudest, which suggested its being carried off its legs, and made to leap again by its own intense enthusiasm. Yet they went very well together, the cricket and the kettle. The burden of the song was still the same; and louder, louder, louder still, they sang it in their emulation. Until at last they got so jumbled together, in the hurry-skurry, helter-skelter, of the match, that whether the kettle chirped and the cricket hummed, or the cricket chirped and the kettle hummed, or they both chirped and both hummed, it would have taken a clearer head than yours or mine to have decided with anything like certainty.

— CHARLES DICKENS.

THE DAY OF THE COMET—By H. G. WELLS

Many writers have attempted to describe great scenes of ruin, such as Mr. H. G. Wells, a famous living novelist, has succeeded in doing in his novel, "In the Days of the Comet," published by The Century Co., New York. Comets have always been associated with ideas of evil to the earth, though we know there is little fear of our world coming to grief by one of these great bodies. But the novelist is entitled to use, for the purposes of his story, the idea of mankind being destroyed by the earth passing through the poisonous gases of a comet. Mr. Wells gives us a picture of what he imagines might then happen, told with a genuine power of vision which gives an impression of one great universal disaster.

EVERYWHERE on earth that day, in the ears of everyone who breathed, there had been the same humming in the air, the same rush of green vapours, the streaming of shooting stars.

The Hindoo had stayed his morning's work in the fields to stare and marvel and fall; the blue-clothed Chinaman fell head foremost athwart his midday bowl of rice; the Japanese merchant came out from some chaffering in his office amazed, and presently lay there before his door; the evening gazers by the Golden Gates were overtaken as they waited for the rising of the great star. This had happened in every city of the world, in every lonely valley, in every home and house and shelter, and every open place.

On the high seas the crowding steamship passengers gaped and marvelled, and were suddenly terror-stricken, and struggled for the gangways, and were overcome; the captain staggered on the bridge and fell; the stoker fell headlong among his coals; the engines throbbed upon their way untended; the fishing craft drove by without a hail, with swaying rudder, heeling and dipping.

The great voice of material Fate cried "Halt!" And in the midst of the play the actors staggered, dropped, and were still. In New York that very thing occurred. Most of the theatrical audiences dispersed; but in two crowded houses the company, fearing a panic, went on playing amidst the gloom, and the people, trained by many a previous disaster, stuck to their seats. There they sat, the back rows only moving a little, and there, in disciplined lines, they drooped and failed, nodded, and fell forward or slid upon the floor.

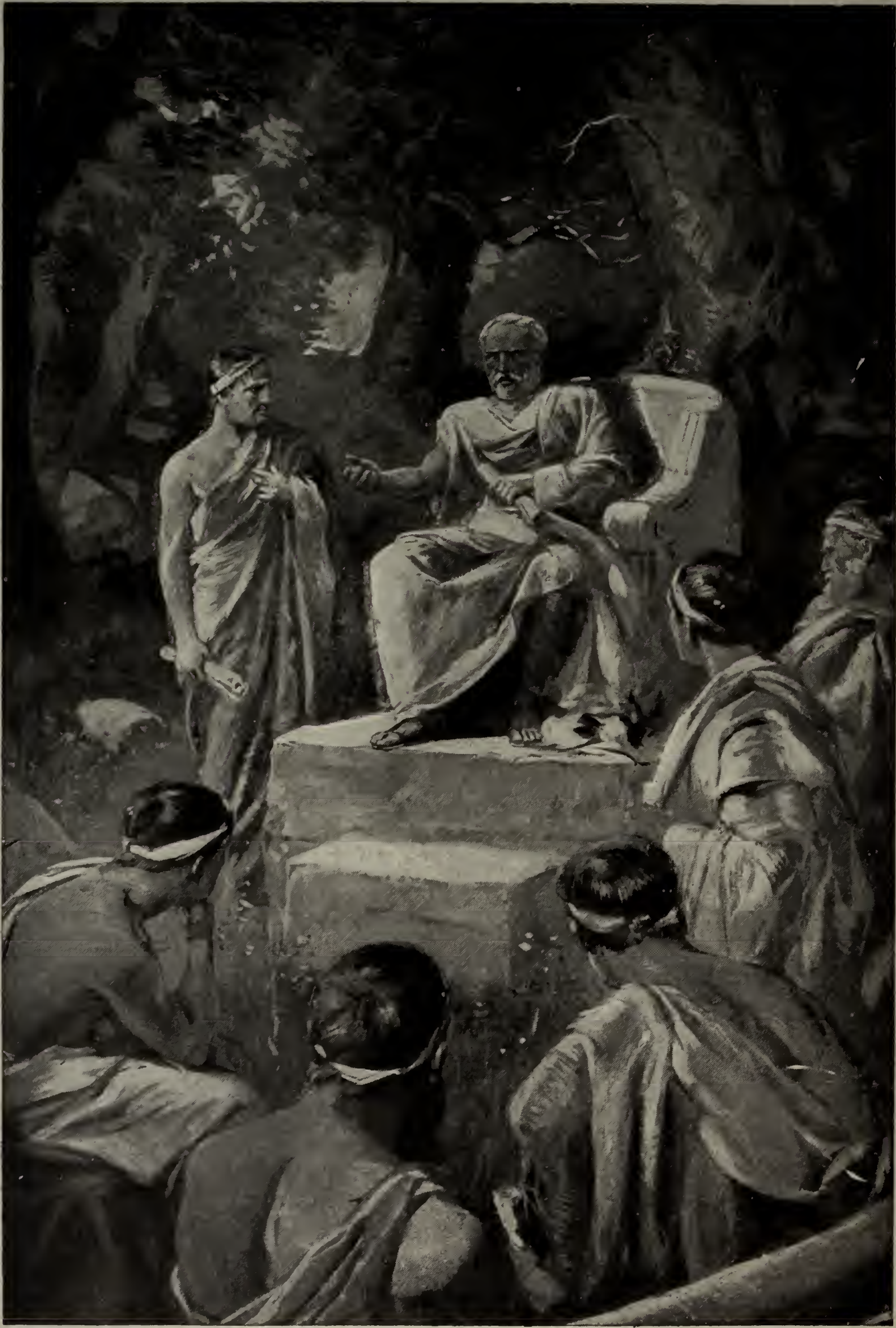
In London it was night; but in New York, for example, people were in the full bustle of the evening's enjoyment. In Chicago they were sitting down to dinner; the whole world was abroad. The moonlight must have illuminated streets and squares littered with crumpled figures, through which such electric cars as had no automatic brakes had ploughed on their way until they were stopped by the fallen bodies.

People lay, in their dress clothes, in dining-rooms, restaurants, on staircases, in halls. Men gambling, men drinking, thieves lurking in hidden places, were caught, to arise with awakened mind and conscience amidst the disorder of their sin. America the comet reached in the full tide of evening life, but Britain lay asleep. But Britain did not slumber so deeply but that she was in the full tide of what may have been battle and a great victory. Up and down the North Sea her warships swept together like a net about their foes.

The Hungarian, the Italian peasant, yawned, and thought the morning dark, and turned over to fall into a dreamless sleep; the Mohammedan world spread its carpet and was taken in prayer. And in Sydney, in Melbourne, in New Zealand, the thing was a fog in the afternoon, that scattered the crowd on race-courses, and stopped the unloading of shipping, and brought men out from their afternoon rest to stagger and litter the streets.

THE NEXT STORY OF FAMOUS BOOKS BEGINS ON PAGE 5593

PLATO TEACHING IN HIS OPEN-AIR SCHOOL



Not far from Athens was a beautiful plantation that was called the Academy, after one of the Greek heroes, Academus, who had once owned the place. Here, amid the plane and olive trees, Plato gathered his disciples and held his open-air school, and in this picture we see him teaching his followers, many of whom were old men. After Plato died, the Academy was for many centuries still used as a place in which philosophers taught their disciples.

HOW REGULUS WENT BACK TO DIE

CONTINUED FROM 5386

For many years the citizens of ancient Rome had been extending their domains, until in the year 270 B.C. they ruled over almost all Italy. The Romans then crossed over to Sicily, and there came into conflict with another race of brave and adventurous conquerors called Carthaginians.

A terrible struggle for the mastery now began. At first the Romans were victorious on land and sea. Elated with success, they decided to carry the war into Africa, and a large army, under Attilius Regulus, landed and swept all before them, until they came in sight of Carthage. Then, indeed, the prosperous Carthaginians roused themselves to defend their hearths and homes, and utterly vanquished the Romans. Regulus and a host of Romans were led captive into Carthage.

The war, however, went on until after fourteen years the losses of both sides were so great that the Carthaginians hoped that peace could be made. They summoned Regulus, the captive general, before them, and said:

"We are weary of the war, and are sending an embassy to try to arrange a peace and an exchange of prisoners with your senators at Rome. Go you to Rome and prevail on them to agree. But first give us your word as a Roman that, if you fail, you will return to captivity here."

When the embassy reached the gates of Rome, Regulus stood still and cried:

"No longer am I either a citizen or a senator of this great city; neither will I enter within her walls, nor will I take my seat in her noble Senate."

On learning of this resolve, the Senate sent certain of their number to confer with Regulus in the presence of the embassy as to whether they should yield. But the undaunted Regulus spoke out courageously:

"To no purpose is it to ransom prisoners who have ignobly yielded while they still bore weapons in their hands; let them be left to perish; let war with Carthage go on till Carthage be conquered."

His counsel prevailed, the unsuccessful embassy returned home, and with them, true to his word of honour, went back the bold, resolute patriot, though he knew that he would receive little mercy at the hands of his captors, whose hopes of peace and returned prosperity he had so stubbornly overthrown.

Tiber's banks were crowded with his fellow-countrymen as he embarked on the ship that was to bear him across the sea. It was the most glorious moment of his life as he stood on the ship bidding farewell for ever to those Roman senators, to whose wavering courage he had given fresh life.

And so Regulus entered Carthage once more, and his counsel was repeated to the cruel Carthaginians. They had not enough nobility of spirit to reverence a brave patriot, and they devised horrible tortures and put him to a most cruel death.

THE BOY WHO DIED FOR THE REPUBLIC

In the terrible times of the French Revolution many acts of heroism were performed by both Royalists and Republicans. A striking instance of patriotism on the part of a boy of only thirteen, named Joseph Barra, is recorded. In the province of La Vendée, where the peasants fought for the king, a band one day surrounded Barra and insisted that he should shout "Long live the king!" With bayonets and knives pointing to his breast, the brave boy shouted, "Long live the French Republic! For her I die with joy," and the next moment fell pierced with many wounds. His body was taken to the Pantheon, the burial-place of heroes, at Paris, where his remains lie to-day with those of Voltaire, Rousseau, and Victor Hugo.

CONTINUED ON PAGE 5615.

CHICAGO, THE WONDER CITY

TODAY, as you have doubtless heard, Chicago is the fourth largest city in the world, with a population of over 2,000,000, and is still growing very rapidly. It is one of the greatest railroad centres in the world and in enterprise, industry and power to surmount obstacles is not behind any city in the world. Yet hardly a hundred years ago the spot on which Chicago stands was a stretch of wilderness with only a house or two to indicate the presence of human beings. Apparently a settlement of Indians existed here in 1671, when it was visited by a fur trader, Nicholas Perrot. Joliet and Marquette visited it a little while later, and La Salle also stopped here. The French seem to have built a little fort here, but it did not continue long. The United States in 1803 built Fort Dearborn on the south bank of the river, west of the present Michigan Avenue, but the fort was destroyed by the Indians in 1812. It was rebuilt, but in 1836 was finally abandoned.

At this time the number of inhabitants of the little town which was growing up about the fort was hardly 4,000. Soon the population began to grow rapidly and it is now the second city in size in the United States. There has always been a spirit of hopefulness about the city which the great fire of 1871 did not check. On October 8 of that year a cow kicked over a lamp in a stable on the outskirts of the city. The blaze grew beyond the control of the fire department and swept like a horrible monster, devouring the wooden buildings which then composed the greater part of the city. About 17,000 buildings were burned and nearly 100,000 persons were left homeless. The total loss was estimated at $190,000,000. Undismayed, the citizens organised committees to relieve the distress, and distributed with care the contributions sent from other parts of the United States and from Europe.

They determined to build the new city in such a manner that such a calamity could never occur again, and ten years later a wonderful city of stone had replaced the old one of wood. Chicago had risen like a phoenix from the flames. The commercial growth of the city has been wonderful. It is the greatest grain market and the great provision market in the world. To its stockyards come hundreds of thousands of animals and Chicago meat is sent to every portion of the world. The city is also the great lumber centre, though with the continued destruction of the forests which gave her this position, she will not be able long to hold that rank.

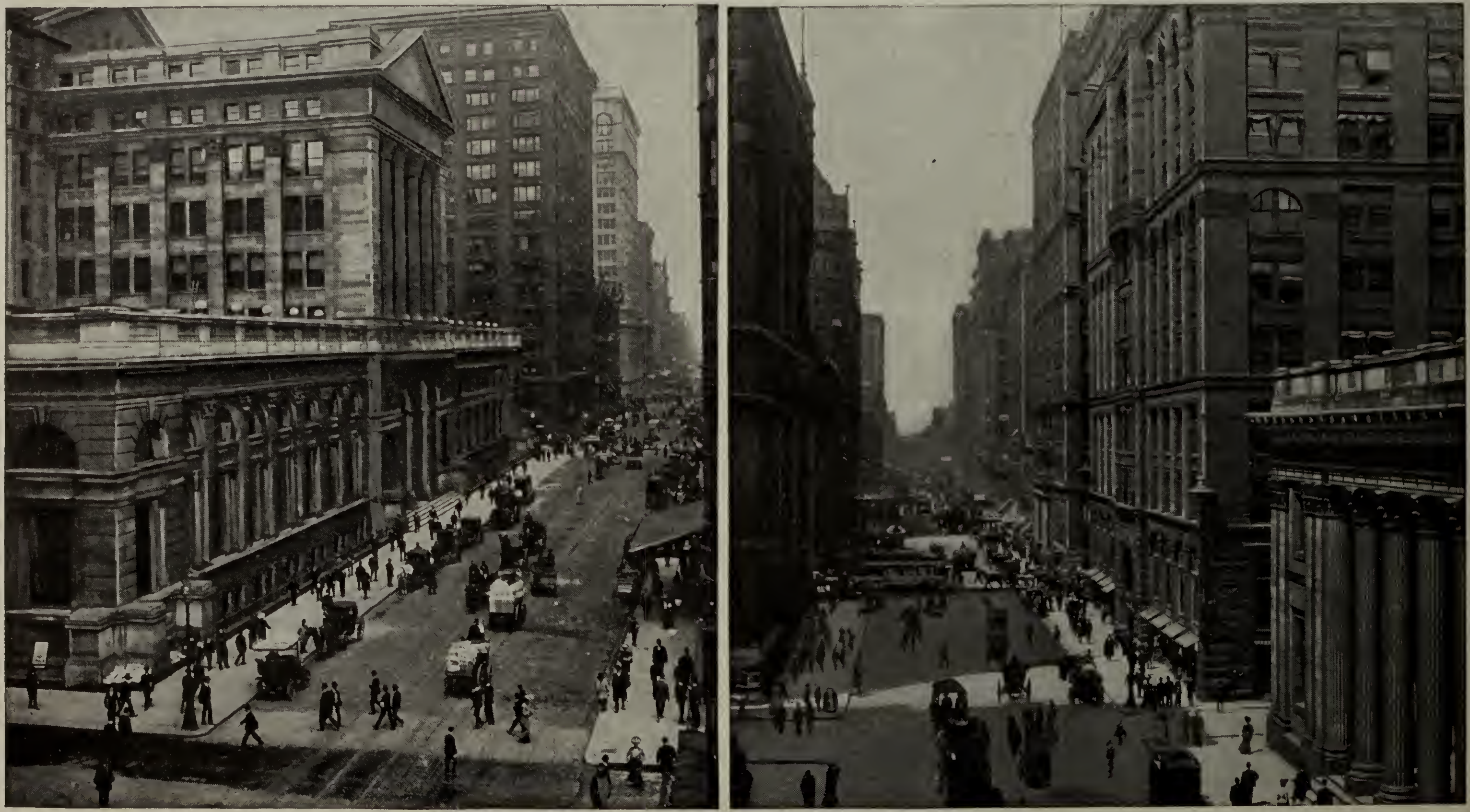
The great World's Fair, celebrating the four hundredth anniversary of the discovery of America by Columbus, was held in Chicago in 1893, a year late, to be sure. The wonderful "White City" was built on the shores of Lake Michigan, close to the spot where Perrot had stood more than two hundred years before. The people of Chicago were determined to make the Fair a success and they succeeded.

Today the spirit of the citizens stands for growth. The city has one of the best public school systems in the country; provides wide parks and playgrounds for its children; is making a determined effort to stamp out the "White Plague;" and is struggling for cleanliness and sanitation. Moreover the citizens are making a determined effort to secure better government, and to control the men they choose to represent them.

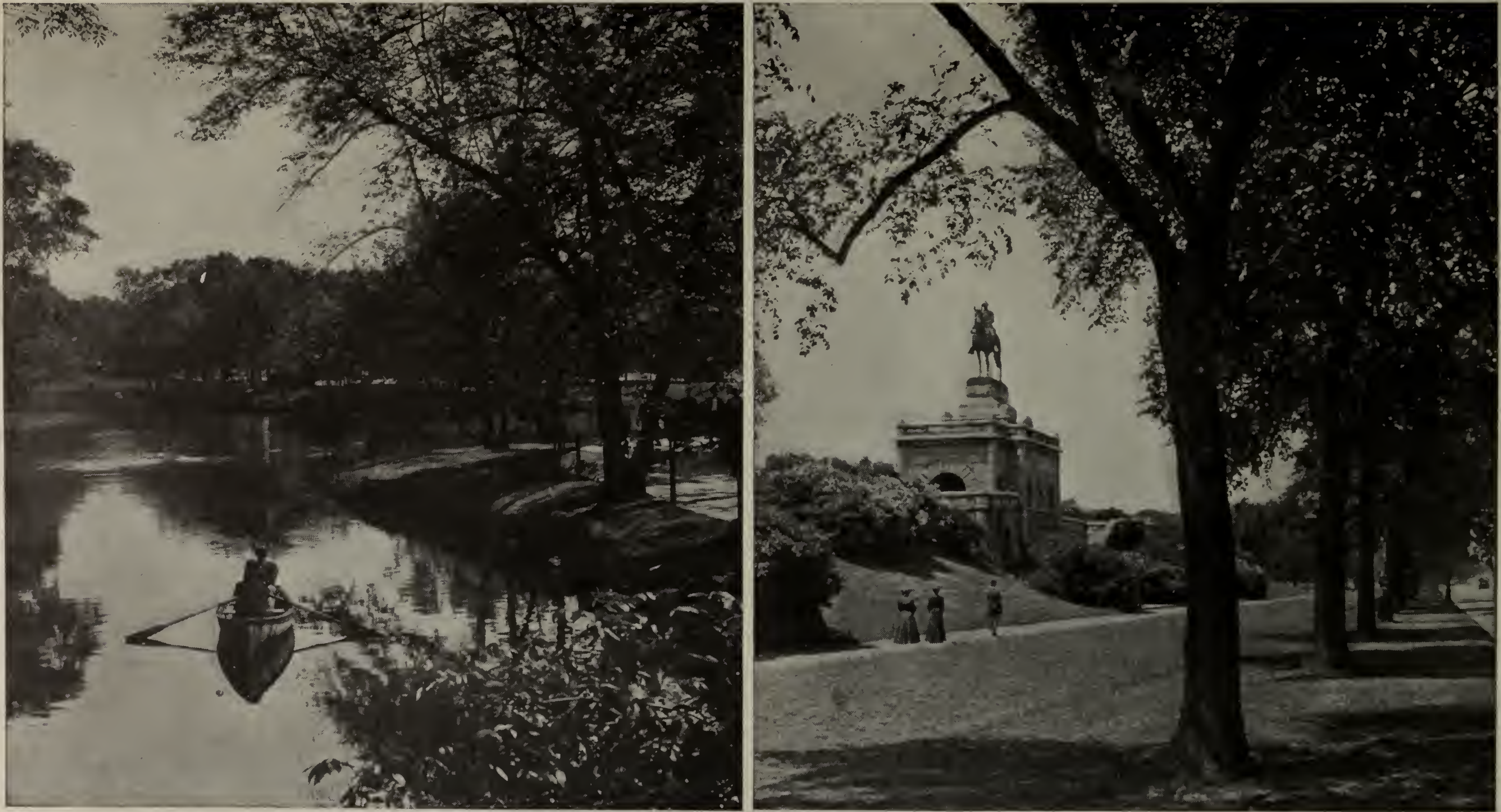
Nor have the means of culture been neglected. For a long time Chicago had one of the best orchestras in the United States. It encourages artists, and the exhibitions of pictures held there are often interesting. It contains some of the most beautiful public buildings in the United States and altogether the city seems certain to continue its wonderful progress.

Copyright, 1911, by M. Perry Mills.

IN THE HEART OF A GREAT CITY

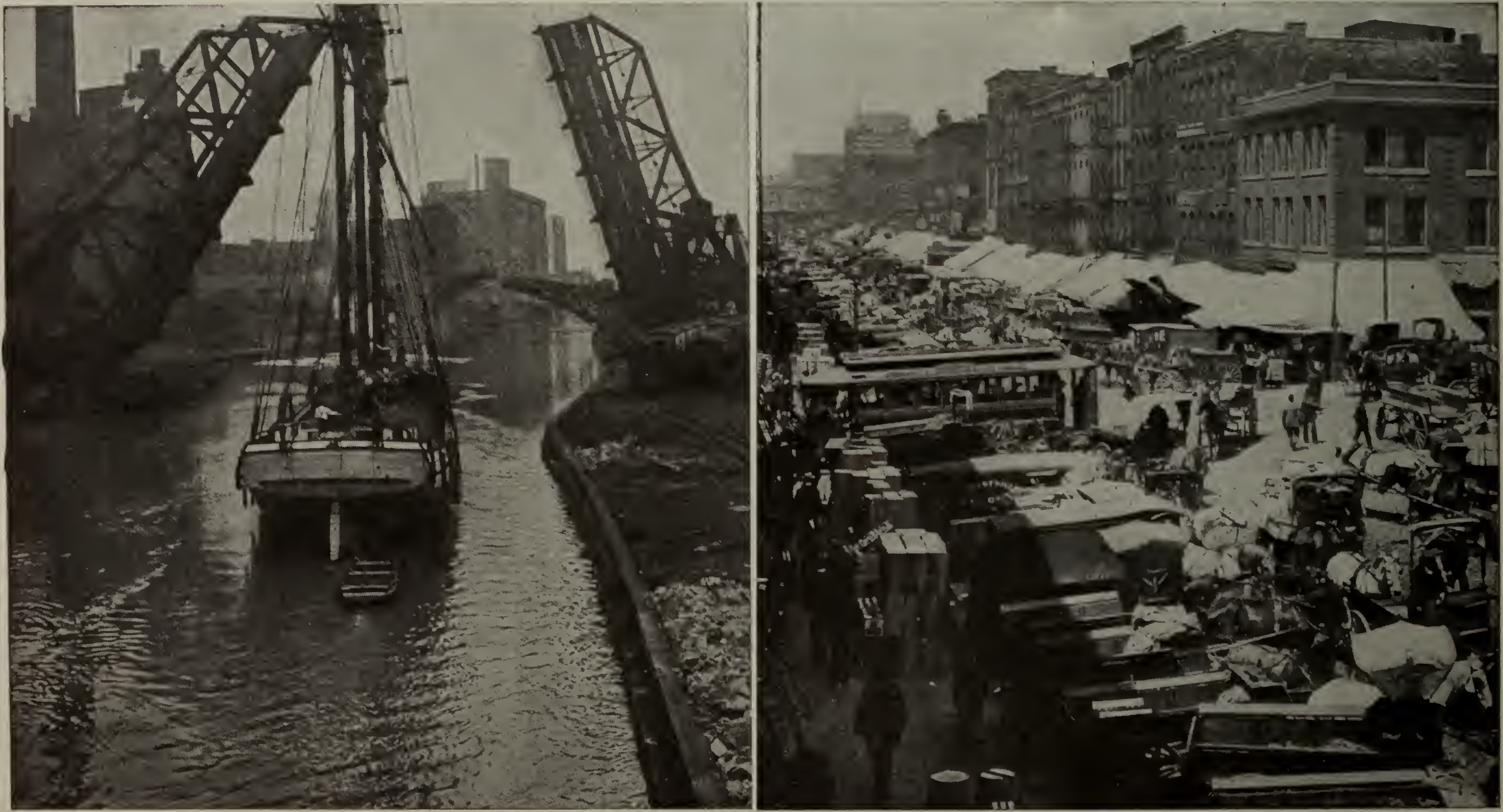


Here we see two streets in the busiest part of the city. To the left is Dearborn Street, with the great new Post Office across the way. To the right is La Salle Street, the very heart of the financial district. The building with the columns is the Illinois Trust & Savings Bank. It is in these streets that Chicago's commercial enterprises centre.



Here are two pretty scenes in Lincoln Park, one of the finest parks in Chicago — a city noted for its beautiful public parks. Among the principal features of interest in Lincoln Park are the Statue of Lincoln by St. Gaudens, shown elsewhere in our book, and the Grant Monument, which can be seen in the picture to the right. The Grant statue faces Lake Michigan on the Lake Shore Drive.

TRADES AND TRAFFIC IN CHICAGO



Chicago is one of the largest commercial cities in the world, so it must have every facility for forwarding its trade. Here is a picture of one of the railway bascule bridges on the Chicago river which opens up to allow the tall masted schooners to pass through. On the right we see the Produce Market from which comes the food to supply this mighty city.

HALLS OF LEARNING AND OF WEALTH

Here is a picture of the University of Chicago, showing the campus and a few of its many buildings. This college is one of the largest and most progressive in the country, and has a very fine library of nearly four hundred thousand volumes, which is made good use of by the thousands of students who attend the college every year.

Here we see a hall in the interior of the Chicago First National Bank. This is perhaps the finest banking building in the world. Chicago — a city of over 2,000,000 people, with its immense commercial enterprises, necessarily does one of the largest banking businesses of any city in the world.

THE STORY OF A WATER NYMPH

CONTINUED FROM PAGE 5424

Once upon a time many years ago, there lived an old fisherman and his wife. They were lonely people, for their bit of land lay upon the edge of a large lake, while back of it stretched an enchanted forest through which lay the road to the market where the old man sold his fish. To their great joy it came to pass that a child was born to them, a beautiful little girl. One day as the mother sat by the edge of the lake, her baby in her arms, the child, attracted by some beautiful thing in its clear depths, leaped forward into the water, sank instantly below its surface and was gone. That same evening, while the parents were mourning the loss of their child, a tap came at the cottage door and a lovely little girl about three or four years of age stood upon the threshold.

When the girl was about eighteen years old, there came through the enchanted forest to the old fisherman's hut a wonderful knight named Hildebrand. He had made his way through the gloom and mysteries of the forest with great difficulty. Horrible little dwarfs had tried to frighten him away; a great tall man in white had continually blocked his path.

Hardly had the knight reached the shelter of the cottage when a great storm came up which lasted several days. The waters of the lake rose to such an extent that the little promontory where the old couple and their foster daughter lived became an island and all passage out into the world beyond was cut off. During this time the lovely Undine and the handsome knight were very much together, and became very fond of each other. One night while the storm was still raging a priest, who had been driven to their shore by the fury of the waves, sought the protection and shelter of the little cottage. The good father soon became aware of the attachment of the young couple and before the evening was over it was arranged, much to the joy of her foster parents, that Undine and the knight should be joined in holy wedlock.

Now it happens, as perhaps you've heard, that the air and elements among which we live are inhabited by beings as wonderful as ourselves and far more beautiful. Especially are the seas and rivers and even the little brooks full of these lovely beings so like us but with this great difference, that they have no souls. Therefore when they die they vanish into dust, leaving no trace behind, and have no hope of a more beautiful after life. To find a soul it is necessary for one of these lovely creatures to become united to one of our race, and it was for this purpose that Undine's father, a great prince of the Mediterranean Sea, sent this little daughter to the fisherman's cottage that night so long ago.

When Hildebrand became aware of the fact he was at first dismayed, but Undine was so lovely, and indeed since the night of the wedding so changed, so gentle, so biddable, that he dismissed his fears, and clasping her to him, vowed eternal love and protection. The morning after the wedding found the sun shining gloriously and the waters so far receded that there was no longer need of delay.

Great was the rejoicing at the arrival of the knight and his beautiful bride. There was one however who could not rejoice. This was Bertalda, foster child of the Duke and the Duchess of the Imperial City; for she it was who had sent the knight into the enchanted forest as a test of his love for her. So there was, as you can see, nothing but jealousy in her heart for the young bride who had won his heart at the other end of the dark forest. For Bertalda, however, Undine soon felt the greatest affection, and when she discovered from her uncle Kuhleborn, a powerful water-sprite, who inhabited the waters of that region and with whom she had frequent intercourse, that Bertalda was no other than the lost daughter of the old fisherman and his wife, her joy knew no bounds. Thinking in her innocent heart to give a delightful surprise, she planned a dinner at the end of which the secret of Bertalda's birth, which up to that time had remained a mystery, was to be revealed. At the appointed time

Copyright, 1911, by M. Perry Mills.

the announcement was made, but Bertalda became so enraged that the Duke and the Duchess withdrew their protection and even her own poor parents refused to receive her.

In the costume, therefore, of a fisher maiden she was encountered by Hildebrand and Undine as they drove out of the city toward Castle Ringoletten, situated near the source of the Danube River. At sight of Bertalda's misfortune Undine was full of sympathy and would hear of nothing but that Bertalda should accompany them on their journey and they should share all things as sisters in love and affection. For a time all went well at Castle Ringoletten, but gradually Bertalda lost her suddenly acquired humility; she became again the proud and haughty lady, and encouraged by the admiration which Hildebrand no longer strove to conceal, she frequently assumed the position which Undine as rightful lady of the castle should have held. Kuhleborn, ever watchful for the welfare of his niece, became aware of her unhappiness and by his frequent visits and sudden appearances in the castle frightened Bertalda and added to the knight's growing aversion to his gentle wife. At last, in order to prevent the reappearance of her mysterious relative, Undine ordered the great fountain in the courtyard of the castle to be sealed up. For a time again all went well, Hildebrand felt a return of affection for his trusting wife, and secure in their new found happiness, Undine suggested a much talked of trip down the Danube as far as Vienna. She had often warned her husband against showing any trace of anger or displeasure toward her while on the water, but no sooner had they entered the domain of the watchful Kuhleborn than they were tormented by his impish tricks. Undine had constantly to rebuke him for his insolence and their pleasure was completely spoiled. Kuhleborn's mischievous pranks became more and more violent until in a flash of rage Hildebrand commanded his trembling wife to return to her mysterious kindred of the sea and trouble him no more.

The Lord of Ringoletten and Bertalda returned alone to the castle and for some time lived in mourning and great sorrow, thinking only of their love for Undine and forgetting entirely their feeling for each other. But as often happens, gradually the knight's sorrow grew less. He thought less often of Undine and more often and with still greater fondness of Bertalda. At last the nuptial day was set and Father Heilmann was summoned to perform the ceremony. Upon receiving the summons the priest immediately set out for the castle, not indeed to perform the marriage rite, but if possible to prevent it, for Undine had appeared to him in a dream imploring him to prevent the marriage, and thus to save Hildebrand's life, for she was still alive. In spite of Father Heilmann's advice, preparation for the coming festival went on according to arrangement, and indeed all might have been well had not Bertalda bemoaned the fact that the fountain, from which such healing waters used to flow, had been sealed up. Hardly had she uttered the words, when, as if impelled by some strange power within, the stone rolled away, and from the opening of the fountain rose a female figure draped in white. Weeping bitterly and wringing her slender hands, the sorrowful figure glided silently through the courtyard and up the stairs to the knight's own room, where he stood lost in gloomy melancholy. "They have opened the spring and you must die," she said very gently. Drawing him to the couch, she laid her lovely head against his breast and encircling him with her arms she wept and wept until he too began to weep, and finally exhausted sank back upon the pillows dead. "I have wept him to death," she said to a group of maidens as she passed out.

They buried him in a little country churchyard near the castle. In the funeral procession was a white-robed figure that wept unceasingly. When the mourners knelt it knelt too, but when the rest arose the white figure had vanished and in its place gushed forth a little silver streamlet that gradually encircled the knight's grave and continues to do so to this very day.

THE FABLES OF ÆSOP THE SLAVE

THE LION AND THE DEER

A DEER who was being hunted was so nearly caught by the dogs that he rushed into a cave in the hill-side in order to hide.

No sooner, however, had he entered than he saw a huge lion crouched at the farther end of the cave. The lion sprang upon the unfortunate deer and killed him.

Just before he died the deer said:

"How unlucky I am! I came into this cave to escape from the dogs and have fallen into the jaws of the lion."

Don't jump out of the frying-pan into the fire.

THE FOX AND THE ASS

AN ass one day found a lion's skin, and, dressing himself in it, he went about the fields and woods frightening all the other animals almost out of their lives.

Presently he met a fox, and, wanting to frighten him, too, he not only rushed at him very fiercely, but he tried to imitate the roaring of the lion.

"Sir," said the fox, "if you had only held your tongue I might have taken you for a lion as the others did; but now that I hear you bray like a donkey, I know quite well who you are."

Our characters are often shown by what we say as well as by what we do.

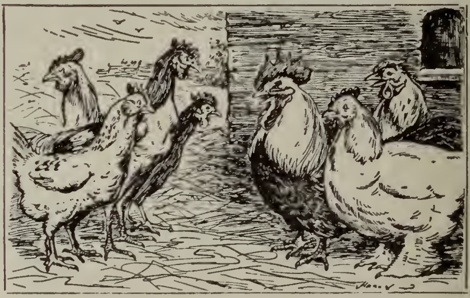
THE WASPS IN THE HONEY-POT

A MAN one day hung a jar in his garden containing a little honey. There were a great many wasps about at the time, and nearly every one crawled into the jar to get the honey. There they got their legs and wings so sticky and smeared with the honey that they were all stuck together, and only a few of them succeeded in getting out and flying away. All the rest stayed in the jar, and in a short time died.

If we get into bad habits it is very difficult to get out of them.

THE FAT AND THE LEAN FOWLS

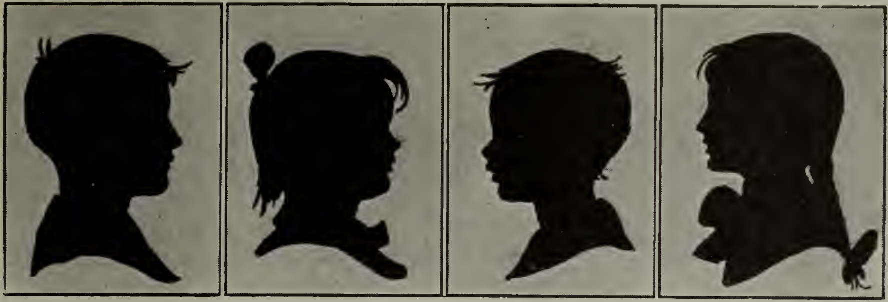
ONCE upon a time there were a quantity of fowls living together, in a yard. Some of them were very fine and fat, while others were thin and ill-looking. The fat ones were often making fun of the lean ones, calling them starvelings and skeletons and other names.



One day the cook was ordered to dress several fowls for dinner, and to be sure that she took the best in the yard. The result was that the fat fowls were caught and cooked, while the thin ones were left; so that in the end the fat fowls wished that they had been thinner.

Never despise people who are not so well off as yourself, who may be better than you.

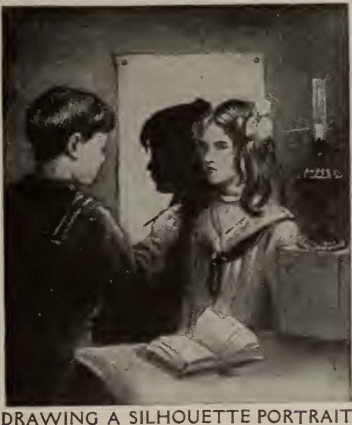
THE NEXT STORIES BEGIN ON PAGE 5651



MAKING AN OUTLINE PORTRAIT

CONTINUED FROM PAGE 5458.

In the days of long ago, before photography was invented, our grandfathers and grandmothers used to have portraits of themselves taken sideways. They were what were known as silhouette portraits, and they were not taken with a camera, but were cut out of thin black paper, and stuck upon a white card. The word *silhouette* comes from the name of Monsieur Etienne de Silhouette, a French Minister of Finance in 1759, who was thought to be very mean, and it was given to this kind of portrait because it consists of the mere outline, and is quite mean, or meagre, in detail. Until a few years ago men might often have been seen in the streets of Boston and other big cities who, for a penny, would cut out a silhouette portrait of anyone who cared to stand before them for a few minutes. These portraits were about the size of a carte-de-visite photograph, and were often very good likenesses. Of course, these portraits were more or less accurate as side views of the face, according to the skill of the man who cut them out. If he had much artistic ability they were good likenesses; if not, they were sometimes very poor. But in still earlier days, when silhouette portraits were fashionable and popular, they used to be done in a more scientific way. The person whose portrait was to be taken, sat sideways before a screen, with a light on a table on the other side of him, and in this way a clear shadow was thrown upon the screen, which gave a perfect portrait if the light and sitter were arranged properly.



DRAWING A SILHOUETTE PORTRAIT

Then the outline would be traced upon the screen, and from this it was, by mechanical means, transferred, on a small scale, to a sheet of special black paper, cut out, and mounted on card. Many of these old silhouette portraits have come down to us. There is a famous one of Edward Gibbon, the historian, which gives not only his face, but his whole figure, and he considered it the best of all the portraits of himself that had ever been drawn. There is also a famous silhouette portrait of Robert Burns, the Scottish poet.

Now, any clever boy or girl can, with a little care, make silhouette portraits of his or her friends. It is not necessary to have an elaborate screen such as the old silhouette portrait makers used; all we need do is to fasten a sheet of paper on a flat wall, put the sitter near it, with a good light of some kind on a table, placed in such a way as to throw a shadow of our friend upon the paper. Then, with a pencil, we draw carefully round the outline of the shadow, and afterwards cut it out. We may use paper that is black on one side and white on the other, drawing the outline of the face on the white side, and sticking the portrait down with the black side up. Or we may draw the shadow-portrait on white paper, cut it out, and then, using it as a pattern, make a copy in black paper. The picture on this page shows how a person should sit to have his portrait taken in silhouette, and at the top of the page are some specimen silhouette portraits. The sitter should, of course, sit perfectly still while the outline of the shadow is being drawn, and if necessary the head may be supported in some way so that the shadow may remain perfectly still.

Silhouette portraits must show the face sideways, as a front view would give nothing at all distinctive to indicate whose the portrait was; whereas, when the nose and chin are seen, we have the likeness of a person. In arranging the light, we should be careful to place it well back on the table, so that there may be no chance of it being knocked over.

ROBIN HOOD AND HIS MERRY MEN

A LITTLE PLAY FOR THE SCHOOLROOM

THIS play can be acted in a garden. If acted out-of-doors, instead of having the curtain lowered, the actors disappear among the trees.

COSTUMES

Robin Hood, Allan-a-dale, and Little John all wear peaked hats with quills, green or brown tunics, and long stockings with pointed shoes, each carrying bow and arrows and Robin Hood wearing a horn and sword; Friar Tuck, in a monk's habit; Maid Marian, in a short dress with hanging sleeves, and Rosamund, in a close-fitting gown with hanging sleeves; Simon, in a long, loose gown trimmed with fur, and a low, soft hat, and carrying money-bags.

CHARACTERS

ROBIN HOOD. LITTLE JOHN. FRIAR TUCK. ALLAN-A-DALE. MAID MARIAN. SIMON OF LINCOLN. ROSAMUND, Simon's step-daughter).

Scene: The Forest of Sherwood. Wrapped in cloaks, Friar Tuck and Little John, his hat, bow and arrows beside him, are lying asleep under a tree. Allan-a-dale is keeping watch.

ALLAN: The sun is up. Hey, there! Awake, my merry comrades.

Pokes them with his bow.

FRIAR: *sleepily* Good-night!

ALLAN: Wake, rouse thyself; 'tis late! Good-night, forsooth; and thou hast slept without stirring, the last four hours!

Pokes him with his foot. Friar Tuck gets up and rubs his eyes, yawning. Allan pokes Little John, who leaps to his feet and seizes Allan by his throat.

JOHN: Ha, varlet! I've got thee.

ALLAN: Thou'rt a pretty fellow to rouse! Dost take me for an assassin?

JOHN: *laughing* 'Twas an evil dream I had. Thy pardon, comrade. Ha, here comes our liege lady, Maid Marian!

Enter Maid Marian through the trees at back. Little John puts his arrows on his back.

MAID: *smiling* Good-morrow, friends! Now let us make ready the breakfast.

ALLAN: There yet remains some of the haunch of venison, lady.

MAID: Bring it hither!

Allan goes out among bushes on left. Little John and Friar Tuck clear leaves from ground at foot of tree.

FRIAR: There, 'tis well!

JOHN: And here comes the breakfast.

Allan comes back with meat on a wooden platter, wine in a horn cup, and bread. He puts them on ground. Singing heard in distance.

MAID: Listen! 'Tis Robin Hood.

Robin Hood comes in from the back, and presents some wild flowers to Maid Marian.

ROBIN: All hail, my merry men! Come, let's eat! I'm as hungry as a wolf. They sit down and eat. How did you sleep after last night's carouse?

FRIAR: I slept soundly, for one.

ALLAN: Ay, indeed! I could scarce rouse him.

ROBIN: 'Tis well you are rested. I have fine sport for you to-day.

JOHN: Sport?

ROBIN: Yes. 'Tis a rich merchant, Simon of Lincoln, who is travelling through the forest with his step-daughter. Report says he has great riches.

MAID: We'll relieve him of them. 'Tis not just that one man should be burdened with so much gold.

JOHN: Yes, indeed! We will share the burden among ourselves. When comes he, master?

ROBIN: He should be here anon. Now list to me, and I will tell you my plan. This Simon may not be as miserly as reported, so we will give him a chance. I will disguise myself as a beggar. If he gives me alms, he shall go unmolested; but if not, then I fear he will leave us a wiser and a very much poorer man.

JOHN: Hist! What is that?

ROBIN: *standing up* There they come! Hide, all of you!

All hide but Robin Hood, who, wrapped in a cloak, sits under tree. Simon and Rosamund enter on the right.

ROBIN: *holding his hand out* Will my lord give a poor man some money?

SIMON: No! Dost think I have money to give to every idle beggar that besets my path?

ROSAMUND: Nay; I beseech you give the poor man something. I would, and gladly, if I had it.

SIMON: Silence! To Robin: Out of my way, thou wicked knave!

ROBIN: Not so fast, Simon of Lincoln, not so fast! Rises and throws off cloak and hat. So I am a wicked knave, am I? Others come out of hiding. Here be three more—stout, lusty fellows, too.

SIMON: Thieves, as I live!

Tries to run away. Friar and Allan-a-Dale seize him. Rosamund looks terrified.

MAID: Fear not, pretty maid. No harm shall befall thee.

ROBIN: Hand over thy riches, friend Simon.

SIMON: Oh, don't take my money—my dear money, my precious gold! Anything but my gold. Take Rosamund. Only leave me my riches!

Clutches at money-bags, which Little John takes.

ROBIN: Shame on thee, coward! Wouldst barter thy step-daughter for thy miserable gold? We will take it from thee, and give it to her. Thou canst thank thy stars that thou hast gotten off so cheaply. Now go! Simon goes out on left. Maiden, thou hast a starved and ill-used look. Is thy step-father cruel to thee? Gives her money.

ROSAMUND: I—I—cannot—— Weeps.

MAID: Nay, cry not! I see thou art too loyal to betray thy step-father. Come, he shall not harm thee more.

ROBIN: We will conduct thee to kinder friends.

ROSAMUND: But I have no other friends. Oh, let me stay here with you!

ROBIN: Right willingly! What say you, Marian?

MAID: The more the merrier!

Kisses Rosamund.

ROBIN: Come, comrades, let us welcome her with dance and song.

They dance and sing merrily as the curtain falls, or as they disappear here and there among the trees.

THE RIGHT WAY TO DO SIMPLE THINGS

THERE is a right and a wrong way of doing everything, and it will help us in carrying out some of the simplest tasks of everyday life if we know how to set about the work in the best way. These are some hints as to the right way of doing some very simple things:

TO HAMMER IN NAILS

When we are hammering nails into wood, it is a mistake to hold the hammer tightly near the head. The nail must be steadied in place with the thumb and first two fingers of the left hand across the grain of the wood, while a gentle, free tap or two are given, followed by harder and harder blows, and, as the nail gets a firm hold, it is released by the left hand and driven home.

TO COVER A BOOK WITH PAPER

The best material for covering a book is fairly thick brown paper, but sometimes glazed lining is used, and it lasts well.

When covering with paper we lay the book open in it, leaving a margin of about two inches round it, then fold this margin in over the two leaves of the cover. Next we take a pair of scissors, and cut the paper margin at the top in two places slantwise toward what we may call the backbone of the book, repeat this at the bottom, and turn the two little flaps so formed between the binding and our paper cover. Now the margin stands out in two pieces above and two pieces below, so we take the corners of the parts folded over and tuck them down behind the back, between the binding and our paper cover, as far as they will go, and, lastly, fold over the four outstanding flaps.

TO REMOVE A GLASS STOPPER

When a glass stopper refuses to come out of a bottle, we must first give a few regular, steady taps downward, round the neck of the bottle. If this method fails, we may try clasping it in our warm hands, or wrapping the neck round with a rag dipped in hot water. One of these methods will generally release the most stubborn stopper.

TO DRY AN UMBRELLA

When we come in out of the rain, we must dry our umbrella by opening it and placing it, handle downward, in a current of air, which will quickly dry the silk cover; but at the same time we must be careful to select a spot where the dripping water can do no harm. If we place our umbrella in the stand without drying it, the water will in turn rust the ribs and rot the cover at the end of the stick. We must always remember never to roll up our umbrella when it is at all damp, otherwise it will very soon cut and wear out.

MISTAKES THAT ARE MADE EVERY DAY

It is quite wrong to speak of the fable of the "Dog and His *Shadow*." What the greedy dog saw in the water as he looked into it, while holding a piece of meat in his mouth, was not his shadow, but his reflection.

To filter water does not purify it if it is contaminated by impurities dissolved in it. The filtering merely cleanses the water from any solid particles that may be floating in it, and renders it clear.

Water-pipes do not burst when it thaws after a frost. They burst *during* a frost; but it is only when the thaw comes, and the water begins to flow again, that we discover that the pipes have burst.

St. Augustine did not introduce Christianity into Britain. The Christian Church flourished in Ireland and was introduced by Irish missionaries into England a century before Augustine landed in Kent. And so far from Canterbury being the first Christian church in England, the church of Glastonbury existed a hundred years earlier.

King John did not *sign* Magna Charta, as is so often stated in school-books and is usually shown in pictures. What he did was to affix his seal to the document. He was quite unable to write his own name.

Dick Whittington, or, as he should be called, Sir Richard Whittington, Lord Mayor of London, did not owe his fame and fortune to a cat which he brought to London and sold for a large sum to a Moorish king, sending it to Morocco by the hand of a friendly sailor. The story of the cat is an old legend that is found in the literature of many countries far earlier than the time in which Whittington lived.

Jack Cade, the leader of the insurrection in the reign of Henry VI., which is known in history as the Jack Cade Rebellion, was not an ignorant and vulgar rebel as Shakespeare has made him appear to be in the second part of his play of King Henry VI. Cade was, on the contrary, a landowner in Kent, and was married to a squire's daughter.

WESTMINSTER ABBEY
This is not an abbey at all

It was not Columbus who made an egg stand on end, but Brunelleschi, the great Italian architect, who did it when his critics asked him how he was going to support the great dome that he proposed to erect for the cathedral at Florence.

The date of the birth of Jesus was not A.D. 1, as is generally reckoned, but at least four years earlier, for we know that Herod died four years before the beginning of the Christian era; and so, strange as it may seem, Jesus was really born 4 B.C.

It is quite wrong to write lbs. and ozs. as the plurals of lb. and oz. These abbreviations are from the Latin words, and the plurals should be lb. and oz. We might as well write ds. and ss. for pence and shillings as lbs. and ozs. for pounds and ounces.

Mohammed did not write the Koran, for he was unable to write. He probably dictated it to some scribe or scribes who could write.

The monument called Cleopatra's Needle, which was brought from Egypt, and stands on the Thames Embankment in London, was not erected by or in honour of Cleopatra, and should be called after Thothmes, the monarch who first set it up.

The Duke of Wellington did not say "Up, Guards, and at them!" at Waterloo, as is so often stated.

It is quite wrong to speak of Westminster Abbey. The abbey has long since disappeared, and what remains is the church belonging to the former abbey. The proper name of this building is the Collegiate Church of St. Peter.

There never was a Lord Bacon. When Sir Francis Bacon was made a peer, in 1618, he became Baron Verulam; and three years later, when he was raised a step in the peerage, his title was Viscount St. Albans.

Cork legs, for those who are so unfortunate as to lose a limb, are never made of cork. Artificial legs obtained this name from the fact that most of the makers of such articles lived in Cork Street, Piccadilly.

Coffee berries are not berries at all, but the seeds out of the berries, which are, in appearance, very much like ripe cherries.

Briar pipes are not made of briar wood, but of *bruyere*, the French name for the white Mediterranean heather root.

Deer forests are not forests at all, but tracts of land which have been placed out of cultivation for the hunting of deer.

The big and older Polar bears of the Arctic regions are not white, but a dirty brown colour, and are called by sailors in the North "old Brownie."

So far from being the king of beasts, in courage and daring and strength, as many books describe him, the lion is a coward that will always run away from hunters rather than fight, and he is not nearly so powerful as the tiger.

Tortoises do not eat black-beetles, although many people keep a tortoise in the house because they think it will rid their kitchens of beetles.

Ants' eggs, such as are used for feeding fish in aquariums, are not eggs at all, but the chrysalises of the male and female ants.

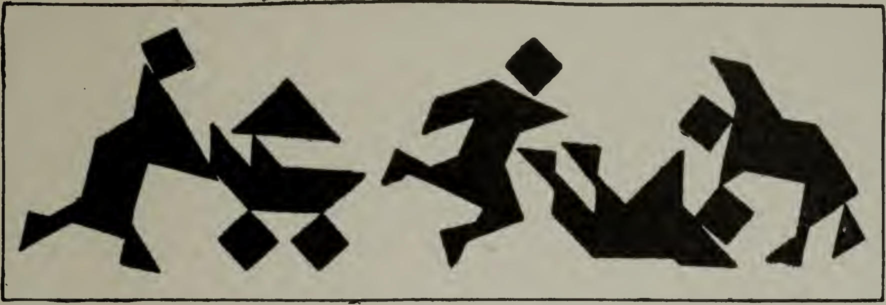
All moths are not kept away from clothes by packing carbon, camphor, or lavender with the garments. Sometimes such precautions are quite worthless.

Moths do not eat clothes. The holes in garments and curtains and carpets are made by the maggots that are hatched from the eggs laid by the moth.

A whale is not a fish, but a mammal—that is, a creature that feeds its young upon its own milk.

It is quite wrong to suppose that a man has one rib fewer than a woman. This error arose from the story in the book of Genesis of Eve being made from one of the ribs of Adam.

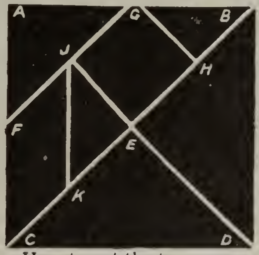
Whales do not spout water. They breathe out air, and when they are just below the surface the breathing sometimes shoots up some water from the surface of the sea.



THE LITTLE BLACK TANGRAMS

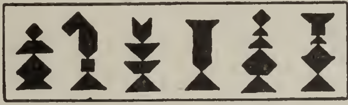
Tangrams are little black cards of various shapes that are supposed to have been first designed in China many centuries ago. Any boy or girl can make a set of tangrams by taking a square of black card and cutting it up into seven pieces as shown in the picture on this page.

Cardboard that is black on both sides can be bought at most stationers', but if there is any difficulty we can ourselves make the card black by colouring it with ink, or by pasting over ordinary white card a piece of black paper. It is not absolutely essential that the card should be black; any other dark colour does fairly well, although it must be acknowledged that black is really best for the purpose for which tangrams are used—it shows up so well.



How to cut the tangrams

To cut the tangrams, we take a square of card, and this may be of any serviceable size—say, three inches square. We cut, with a sharp penknife, from C to B. Then we find the middle point of C B, which is E, and cut from E to D. The remaining pieces are easily cut to the right sizes, for the various points to and from which we cut are all the middle points of lines. Thus, G is the middle of A B, F of A C, J of F G, K of C E, H of E B. Having cut the square up as shown, we have seven pieces of card of varying size—two large triangles, two small, one of medium size, a square, and a rhomboid, F C K J. The card should be black on both sides, so that this latter piece may be used on either of its sides.



Chessmen made from tangrams

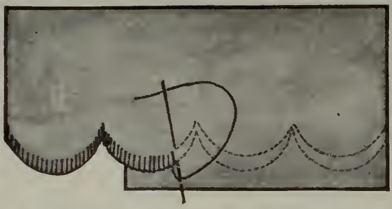
By putting these seven pieces of card together, we can make thousands of silhouette pictures of objects of all kinds. In fact, there is scarcely anything at all on earth or sea or sky that we cannot make with the little black tangrams. It must be understood that in each picture every one of the seven pieces of card has to be used; it is not allowable to leave one or more out; and, further, we must let the whole of each piece of card be completely seen—that is, we must not put one piece partly over another. That pictures of thousands of objects, in fact, of anything, can be made with these seven little pieces of card seems impossible, but it is a fact. Take, for instance, the picture at the top of this page, showing children at play.

Each individual in the group is made up from one set of tangrams, and the perambulator is also made up from one set, so that the whole group of four children and the perambulator can be made out of five sets of tangrams, one set being used complete for each figure. Then, again, in the picture of chessmen, each particular chessman is made of one complete set of tangrams. These are only a few examples of what can be done with the tangrams. We can make men, animals, birds, fishes, flowers, boats, houses, shoes, lanterns, faces, geometrical figures, and so on. It is not always easy, even with a finished tangram picture in front of us as a pattern, to put the tangrams together properly to produce the picture, and we may try it with the examples given in this page. Every one of these can be made up exactly from a set of tangrams.

Even artists have declared it quite impossible to form certain figures and objects out of tangrams, and when they have afterwards been shown how these can be made up, they have expressed great wonder at the possibilities in tangrams. Even the letters of the alphabet can be made quite well, a complete set being used for each letter. With a few sets of tangram cards, endless fun and amusement, together with a good deal of healthy intellectual exercise, can be obtained, and the more one uses these little cards for picture-building, the more fascinating they seem to be. To entertain a company, we should supply each person with a certain number of sets of tangrams and set them all to try their skill at picture-building, a prize being awarded to the one whose picture is decided to be the best.

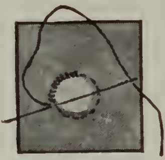
HOW TO WORK ENGLISH EMBROIDERY

Most girls nowadays wear soft linen collars and cuffs, and a very dainty finish to a frock they make. But although, of course, it is quite possible to buy such things ready made from any linendraper's, many of us wisely prefer to make our own. They are very simply made, and we may have many kinds. Pleated muslin edged with lace looks very pretty, and so does ordinary lace fitted on to a little band of muslin. Worked on white or coloured linen, in what is known as broderie anglaise, or English embroidery, they really look quite charming.


1. HOW TO WORK THE SCALLOPS

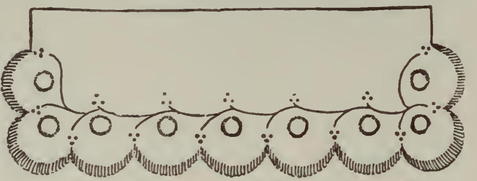
Picture 5 shows a very pretty example of such work. The collar is rounded and of a "Peter Pan" shape, while the cuffs are just a straight piece. These are 6 inches long, and 2½ inches wide. The collar is 3 inches wide, and measures 13 inches on the inside edge and 23 inches on the outside, or scalloped, edge. They are made of white linen, of the sort known as "shirt-front" linen; this kind is firm, and will not pull out of shape. Half a yard of the linen will be sufficient.

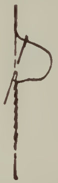
The best white thread to use in the embroidery part is D.M.C., Number 10, costing one penny a skein, and we do our work with an ordinary crewel needle.


2. THE HOLE

The principal part of the pattern of our collar and cuffs is made up of little holes worked round, decorated with an outline pattern of dots and stem stitch.

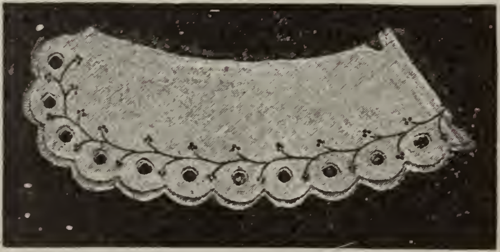
The border of our collar is scalloped and buttonholed. The little holes in the pattern are exactly like eyelet holes, only much bigger. They are not difficult to do, but care is needed not to pull them out of shape while we are working.


3. THE PATTERN OF THE CUFF


4. STEM STITCH

The scalloping can be worked out with the aid of a coin—a shilling or a halfpenny is the right size in this case. We start from the centre-back of the collar, and mark one half-circle in pencil, using the coin as a guide, spacing out the scallops evenly round the edge. We shall find that an ordinary-sized collar will take about 11 scallops on each side of the centre one, that is, 23 scallops in all.

When we have marked the outside edges of the scallops, we must use our coin again to get the inside edge, and make each of the half-circles with a crescent shape.


5. ONE HALF OF THE FINISHED COLLAR

Next we want to put in the circles for the holes. The point at which to place them is easily found, as one hole comes above each scallop. The end of a lead pencil will give us the size, and, if we press it hard on to the stuff, we shall find that it leaves a clear outline on the material, which we can pencil over if we do it at once. Of course, we might use a Briggs transfer for our pattern, but it is so simple that it seems a pity not to make it ourselves. The dots are next put in—three dots above each scallop-point, and three over each circle, about half an inch above it. The branches are made by connecting up the bunches of dots, as shown in the pattern. This is quite easily done, as the little twigs are short, and we have the dots to guide us. But we must begin our twigs at the centre-back, and from there we make them branch in opposite directions

A very black, hard pencil, cut to a fine point, must be used to mark out the pattern. Before starting, the collar should be pinned to a board with drawing-pins to keep it steady and quite flat. The pencil-marks can be kept from smudging while we work by slightly damping the whole pattern with a sponge and then pressing it with a hot iron. This "fixes" the pattern. Having completed our pattern, we proceed to work the scallops, cutting them away as we go along, being careful to cut only the linen. See picture 1. We must keep the shape of the crescents very neat, and regulate the stitches to fit the shape, making the longest ones come in the middle. Buttonhole stitch is, of course, the stitch used. The "eyelet" holes must be carefully outlined by running a thread round them; then the enclosed stuff is cut out with a very sharp pair of scissors. The hole is edged with plain overcasting stitches, worked very regularly from left to right. See picture No. 2. We should remember to cut the holes a wee bit smaller than we want them to be when finished, because the working always tends to enlarge them. The twig and dot part of our pattern is very simple to work. Each dot is composed of four little stitches placed close together; the twigs are worked in stem stitch, as is shown in picture 4. The inside curve of the collar must be neatly hemmed with Number 60 white sewing cotton, and the cuffs with the same. Two small cuts can be made in the centre of the back of the collar to give a "spring" and make it lie flat when tacked inside the dress; or we can set our collar and cuffs into bands of cambric, three-quarters of an inch wide.

GAMES TO PLAY ON THE BEACH

We all look forward to our holidays at the seaside, and our first desire when we reach our destination is to get down to the beach with spade and pail, and to build castles of sand with trenches all round. A great deal of fun and amusement is to be obtained from castle-building, especially if there is a party of boys and girls. In this case it is better, instead of trying to build an elaborate castle which shall be a model of a real, castle, to pile up sand into a great heap, and dig a deep trench all round, and then, dividing the party equally, to play "King of the Castle." One side holds the fort while the other tries to take it by storm, and, as the sand is soft, we do not hurt ourselves at all as we fall down or get pushed from the castle. For this game we should select a spot where there are no rocks nor big stones, and where the sand is dry. The bigger the castle that we build up, the greater will be the fun. The attacking side may be considered to have won the game when they have turned all the members of the other side off the castle; or a flag may be posted in the middle of the fort, and if the attacking side can seize the flag and take it away, they may be considered victorious.

If there are only two or three of us—not sufficient to form sides for playing the "King of the Castle"—then it is better to build a castle which shall be a good model of a real castle. We must decide upon the shape that the castle is to be, and a very good style is a castle with a round tower at each of its four angles, the towers to be joined up with walls. The tops of the towers and walls should have battlements, and these may be cut, after the castle is built, with an old knife. For scooping out gateways and windows in the walls, an old iron spoon is very useful. For model castles of this kind, it is wise to use wet sand, which will cling well together; otherwise, if we use dry sand, the castle is sure to collapse when we begin scooping out gateways and windows. If there is no wet sand available, we can easily sprinkle sea-water from our pails over the dry sand. The beauty of the castle will, of course, depend largely on the skill and artistic taste of the builders, but it is surprising what perfect models of castles can be built in sand upon the sandy beach.

An excellent game for the beach is trench-digging, and we can easily arrange a competition in which the one who digs the largest and deepest trench in a given time shall be declared the winner. Or we might make the competition one in which a hole or pit of a certain diameter and depth has to be dug and filled with water from the sea, the sea being allowed to run into the hole through a trench which each competitor must dig. The one whose pit gets filled with water first is declared the winner. Of course, in a competition of this kind, the spades of the competitors should all be alike as to size and material. It is much easier to dig with a large metal spade than it is to dig with quite a small wooden one

A TRENCH-DIGGING COMPETITION

A tug-of-war is always exciting, but it is more exciting than ever when played on the beach. The sand makes the result very uncertain. At one time it enables the competitors to get an apparently firm foothold, and then it suddenly and treacherously gives way, so that the ground gained or held is lost. The competitors may, of course, wear their shoes or be barefooted, but all competitors should be alike in this respect—that is, if any are barefooted, all should be. Then, again, the sand being so soft, a fall does not hurt us in any way. If the tug-of-war is pulled barefooted, we must be careful to choose a part of the beach where there are no pieces of glass, sharp stones, or broken shells. A mark, such as a band of seaweed, must be put midway between the two sides before they start pulling, and the side that pulls any of its opponents over this mark is the winner.

A WORD-FORMING GAME

SIGNALLING WITH FLAGS

If a long, clean stretch of sand can be found on the beach, some good races may be run, with the competitors either barefooted or wearing shoes. The results of these races on the beach are always uncertain, because running on sand is very different from running on the pavement or an ordinary road or a field, and far more difficult. When there is no clear track of any considerable length for running on the beach because of pebbles and rocks, we can arrange a steeplechase, and there is much excitement in climbing over these obstacles. We must be careful, however, that in the excitement of the race we do not fall. The sand may be high up on one side of a groin or rock, and far down on the other, so that care must be exercised in climbing over.

On a beach where there are plenty of pebbles mixed with the sand, a good game is to select some short sentence, and collect white pebbles and form the words on the sand with these pebbles. The one who succeeds in first forming completely and artistically the sentence that has been selected wins the game.

Boy and girl scouts, and those interested in scouting games, can have plenty of amusement on the beach, especially if there are boulders behind which to hide. Then we shall find the beach an excellent place in which to do signalling with flags, and, owing to the clearness of the air by the sea, we can signal across very long distances.

These are only a few of the many games that may be played on the beach, and we shall find that if we organise our play—that is, engage in definite games—the time passes much more pleasantly than if we have no regular and settled system of playing definitely.

A TELEPHONE THAT A BOY CAN MAKE

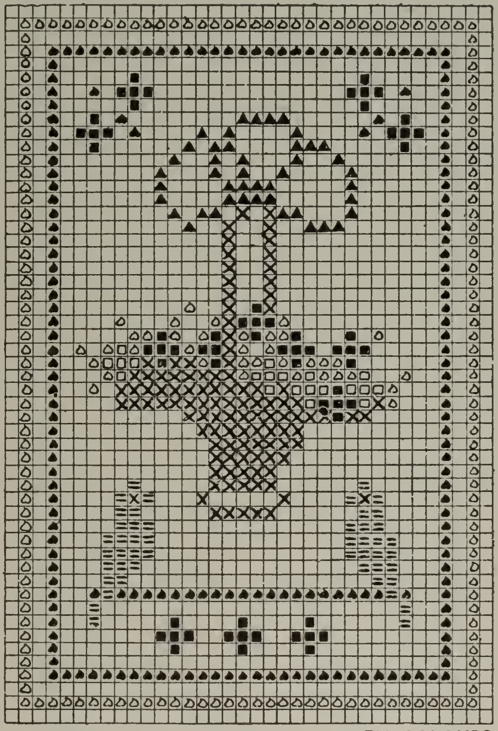
The material for a telephone need cost nothing at all, for it is found in every home. We want two round tin canisters, such as coffee is packed in, about 2½ or 3 inches in diameter. The lids are not wanted, so we put them aside; then we knock the bottoms out of the canisters so as to leave two tin cylinders open at both ends.

Now we cut two round pieces of parchment, like that which is used for covering jam-pots; or, if this is not available, ordinary thick cartridge paper will do almost as well. The diameter of the pieces of paper should be about ¾ inch or an inch wider than the diameter of the tins. We stretch a piece over one end of each of the canisters, and glue the edges down tightly all round. When the glue on the parchment or paper is dry we shall have two miniature drums, which will give a sound like a drum when the stretched paper is tapped with the finger.

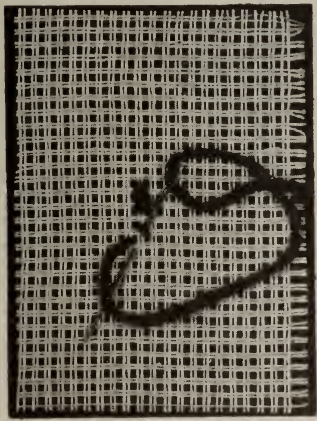
We next make a small hole with a needle in the centre of one of the paper heads and draw through a piece of cotton. Then, removing the needle, we tie a small knot in the piece of cotton and pull it back till the knot touches the paper or parchment. We measure off twenty or thirty feet, or whatever length we require, and put the other end of the cotton through the other parchment head in the same way as the first. Our telephone is now complete, and when two friends stretch the cotton tight, and one speaks into one cylinder, if the other puts the other cylinder to his ear he will hear clearly what is being said. The cotton must be kept quite tight, and must not be allowed to touch anything or the vibrations caused by the voice will be interfered with and spoiled.

A LITTLE PICTURE ON CANVAS

Those of us who have a grandmother have most likely seen the "sampler" which she did when she was a little girl. It is years and years old, and it hangs on the wall in a picture-frame. It has her name on it and the date, and some queer birds and animals, possibly some trees in pots, and some sprigs of flowers. Round it all is a border, and the whole picture is worked in wool on canvas. Now we are going to learn how to do a small sampler or canvas picture for ourselves—much smaller than grandmother's, but quite large enough for us to begin with.


1. THE PATTERN, WORKED IN SEVEN COLOURS

When finished, it will be about the size of a postcard, and the picture on it is made up of a basket of forget-me-nots, tied with a bow, while underneath are perched two little yellow birds. As a great many shops make a speciality of selling little black or dark-brown frames in postcard sizes for ten cents, we shall be able to get our canvas picture framed at no great expense. In fact, it would make a nice little present for someone going away, with its very appropriate message of "Forget-me-not" suggested by the flowers. Now to begin. We shall want very few materials—just a quarter of a yard of double-thread canvas, costing twenty cents per yard, some coloured wool, and a canvas needle. The wool can be obtained in dime balls at almost all the fancy-work shops, and the needles are like darners with blunted points. They are very cheap—about six a dime. The colours of wool used are two shades of green, two shades of blue, one pink, one yellow, one brown, and one deep cream for the background. Pretty soft shades should be chosen, and they must, of course, harmonise. In picture 1, which shows us the design from which we are to copy our pattern, each square represents, in the actual work, a cross, and the whole picture can be copied in this way—that is, by making a cross on the canvas for each square in the position shown in the design. The stitches must completely hide the canvas. In picture 2 we see how a cross-stitch is made. We are going to copy the whole of our picture from the design, and afterwards fill in the background with another colour.

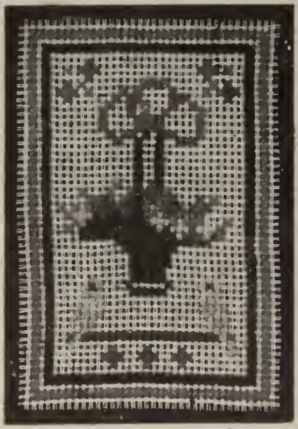

2. THE CROSS-STITCH

Picture 1 gives us the pattern from which to work; this is the "key" to it:

Dark green—filled-in leaf
Light green—outlined leaf
Dark blue —filled-in square
Light blue —outlined square
Brown —cross
Yellow —two lines
Pink —triangle
Cream —not shown

The cream for the background is not shown, all the empty squares left when our pattern is finished being filled in in this colour last of all. We fold the quarter-yard of canvas into three, and cut off one piece, which will be a square of about nine inches. We must turn the edge in half an inch all round, and tack it down with white cotton. This is done, of course, to prevent the canvas fraying out, and also to prevent our wool from catching in the rough edges. Now we have to find the centre of the square. If we feel we cannot guess it near enough, the best way will be to double the canvas diagonally—from corner to corner—crease it, and then unfold it, and do the same from the other two corners. Where the creases cross will be the centre, or, at any rate, it will be quite near enough, as our canvas leaves plenty of margin.

The best way to begin to work our sampler is to start the centre of our picture in the centre of our canvas. If we look carefully, we shall see that the forget-me-not which comes under the handle of the basket is nearly in the centre. So we will chose this to begin


3. THE SAMPLER

with, and make it of blue wool in five crosses. Now we take a thread of green wool, and make a cross on the right of the outside petal of the forget-me-not, then one cross immediately below the last, and then one to the left of that, and one again below. The next cross is below the last, but one square to the left of it; then we make another below, but one square to the left, and then three crosses upwards, which brings us to the forget-me-not again. We take the blue wool again, and make the forget-me-not which comes under the first one, but one square to the right of it. Here are two flowers close together; we make one a light blue and one a darker blue, and then proceed with the green leaves in a similar fashion, just counting the squares. When the pattern begins to work out and show itself it will become most interesting. If we find any difficulty in counting the squares on the canvas, we should think of the squares as crosses, because the texture of the canvas shows them in this way. The handle of the basket is worked in brown wool, starting from the right of our first forget-me-not. The basket itself comes next, as shown in picture 1.

At the bottom of the basket a row of five squares is left to show the rim. These are to be filled in when the background is made. We work the bow in pink, and from this we can easily count to the corner sprays, which are worked in blue and green. For the bar on which the birds are seated we can start from the centre and work outwards—five squares down from the bottom of the basket, and twenty-four for the bar. Next, we work the two birds, and, last of all, the two borders. The birds' eyes should be put in in brown. The birds are made in canary yellow, and the bar in green. The borders also in green, of two shades. We must not forget the three blue flowers below the bar. Picture 3 shows the sampler finished, except for the filling-in of the background. When the background has been filled in with cream, we press the picture on to the wrong side with a warm iron.

ANSWERS TO PUZZLES

ANSWERS TO PUZZLES ON PAGES 5452 AND 5453

1. Aspirate, pirate, irate, rate, ate, at, tear, tea, ear, era, rat, tar.

2. G olf
L ily
A pe
D agger
S ack
T oulon
O nyx
N ora
E lm

3. I ate next to nothing!

4. 96 triangles.

5. Tennyson.

6. Rainbow.

7. A dventure R
L e A
E ntra P
X anthipp E
A riost O
N u F
D o T
E ac H
R emors E
P ul L
O ntari O
P aralyti C
E l K

8. Pen-man-ship.

9. Crow and parrot transformed, become prow and carrot.

10. (1) Pink; (2) Erica; (3) Iris; (4) Anemone; (5) Daisy; (6) Pansy; (7) Lobelia; (8) Harebell; (9) Rose; (10) Gentian.

11. Because the year 1888 began on a Sunday and ended on Monday, and 1889 began and ended on Tuesday.

12. (1) Chase; hovel; avail; Seine; Ellen. (2) Tame; ager; mean; Erne.

13. A piece of coal. When it sleeps on the wing. An L (ell). Short. Noise. Make the vest first. A law-suit.

14. The farmer added on each side of the field a triangular piece of land, its long side the same length as the side, its two short sides each one half the length of the diagonal, of the original field.

SOLUTIONS OF THE PUZZLE NAMES ON PAGE 5458

1. Hunt the slipper. 2. Croquet. 3. Cat and bat. 4. Hockey. 5. Hide and seek. 6. Hop-scotch. 7. Football. 8. Leap-frog. 9. Cricket. 10. Hare and hounds. It will be seen that in some cases the name of the game is spelt by the pictures, and in others it is simply represented by the sounds of the words.

ANSWERS TO THE "WHAT IS IT?" GAME ON PAGE 5457

The things referred to in the game of "What is it?" on page 5457 are: (1) Pumicestone, (2) a snowflake, (3) chalk, (4) the heart, (5) a sponge, (6) electricity, (7) a pearl.

HOW TO MAKE A BLACKBOARD

FIRST of all we must select our board, and the best kind for our purpose is a piece of whitewood thoroughly seasoned. If it is necessary to join two lengths in order to make our board wide enough, we should see that the two pieces are of exactly the same thickness. Then they should be glued together, and a strip about 2 inches wide should be glued top and bottom, also of the same thickness as the board itself. When the glue is dry we should sandpaper the surface to get it perfectly even and smooth. For the solution to make the board black, the following is a very good recipe: 2½ ounces of pulverised pumicestone, 1½ ounces of pulverised rotten-stone, 3 ounces of lampblack, the whole to be mixed with methylated spirit sufficient to make a thick paste. This is taken from a quart of methylated spirit, which is needed to make the colouring solution.

When the paste is thoroughly mixed up, we dissolve 3½ ounces of shellac in the remainder of the spirit, and then mix the whole of the ingredients together, when we have a quart of good black liquid for colouring the board. No oil whatever must be used in the liquid. The black can be applied with an ordinary painter's brush, and several coats should be given, but before giving a new coat we must be sure that the last is perfectly dry. When the final coat has been given and is dry, the board is ready.

WHEN DID YOU LAST SEE YOUR FATHER?

A LITTLE PLAY FOR THE SCHOOLROOM

CHARACTERS

MISTRESS SIDNEY	Wife of Colonel Sidney, a Royalist	
BARBARA SIDNEY	Aged twelve	The children
ROGER SIDNEY	„ seven	
NAN SIDNEY	„ five	
MICAH HOLDFAST	A Parliamentarian	

Scene: The Nursery of Colonel Sidney's house. Roger and Nan are seen playing at soldiers.

The scene needs the simplest furniture—a high-backed wooden chair, one or two stools. Across one corner a wooden draught-screen may be drawn. The dresses should be something like those in the picture.

ROGER: with sword — Nay, Nan; march like me. I fear me you will never make a soldier!

NAN — But my legs *will* be so tired, Roger! Sits down on floor tearfully.

ROGER: Well, rest, then, and I will sing and march alone. Sings a line or two of any Cavalier song.

MISTRESS: My dear, dear hearts. As she enters hastily, falls on her knees by little Nan, throwing one arm round her and holding out the other to Roger. Mother knows not what to do!

ROGER: coming to her — Mayhap a man like me may help you, mother!

MISTRESS: I would, indeed, you were more grown; then you might understand our desperate strait. But my dear ones are but babes.

ROGER: Babes! Nan is a babe. See, mother, do babes carry swords like this? Frees himself and stands erect.

NAN: I am big, mother. My legs are not tired now.

MISTRESS: O what to say, what to do? Hearken, sweetings! Those stern men in the great hall would have you there anon. I prayed them let me come to fetch you.

ROGER: But I am not afeared, mother. I stood there, and heard them ask you and Barbara and the servants about father.

MISTRESS: Roger, my dear, dear lad, you heard me say I had not seen father, heard Barbara answer the same, and now they will speak with you!

ROGER: sturdily — Let us go; I am not afeared. But as Nan is a babe, she may be. Let her play here.

MISTRESS: Nan must e'en come, too. My little son, my little son, what can I say? I am full of fear for what thou mayest say. That curly head of thine does not much more than reach the top of the great table in the hall.

BARBARA: running in hastily — Mother, mother! I have run with such speed that I scarce have breath to tell you! After that soldier closed the door upon us, there was no one watching without, so I stood a moment to hearken. Ay, I know 'twas not a seemly thing to do, not like my father's daughter. I heard them say they would follow swiftly upon you, not send for the children to the great hall, but take them unawares at their play, ere you had time to prepare them.

MISTRESS: in desperation, rising — Prepare them! I am at my wits' end! We have lied to no purpose; they must now discover all.

BARBARA: Mother, do not despair. Something may yet be done. Let us pray these men to leave the children to their play.

MISTRESS: And, so assure them we have matters to hide. Speaks aside with Barbara. Your father begged so hard he might kiss Roger and Nan as they slept in their beds yonder, and I had not the heart to stay him. Nan never stirred, but Roger—— Hush! Are those steps on the stair? The children return to their play.

HOLDFAST: speaking before entering — Then, sirs, tarry without here, and the task shall be mine. Enters. Ah, mistress, we do not put you to the pain of bringing the lad to us, but come to him. Hither, lad! What, playing? 'Twere better to learn good texts. Sits in great chair.

ROGER: I am a soldier, sir. But this is my mother's chair. She stands yonder. You may have my stool.

HOLDFAST: I stay where I am, young sir! 'Tis not for such as thee to chide me! Art not afraid?

ROGER: No, sir. Nan may be, because she is a little maid and cannot learn to be brave.

HOLDFAST: So, art brave, then? Hearken! Dost know that the Lord God punishes, with heavy wrath, those who lie? Dost believe this?

ROGER: No, sir.

HOLDFAST: What! 'Twere well that godly men had the handling of thee!

ROGER: Sir, I say, "Our Father."

NAN: And I say it, too, 'most as well as brother. Running forward.

HOLDFAST: That word "Father" comes readily to these lips.

ROGER: I love father. So would you if you knew him well. Mother thinks you would harm him.

MISTRESS: He is but a babe, and speaks like a babe. Let him go! Have you no mercy?

HOLDFAST: I would hear him speak.

ROGER: going to his mother Mother, I will not speak if you bid me not. See, I can close my lips so firmly! None shall make me open them.

HOLDFAST: But I have a question for him to answer. Mistress Sidney springs forward. Nay, madam, stand back! There are men-at-arms without. Barbara draws her away. Boy, answer me in the name of God: "When did you last see your father?"

ROGER: I saw my father last night.

HOLDFAST: Ah, madam! What now? Canst dare still show a calm face? Rises. The Lord hath delivered him into our hand! Hallo! Without there! Enter, and triumph with me! None answers! Turns to Roger. 'Tis a good lad! Last night! Didst speak with him? Draws Roger forward.

ROGER: Ay, I saw him. He spoke with me. Told me to fear God, honour the King, and love my country.

HOLDFAST: You saw your father last night. Wilt show me where? Thou shalt play soldiers all day. Take my hand, and lead me.

ROGER: 'Tis easy to show you, sir. But I would not take your hand. Men walk alone.

HOLDFAST: walks towards door Come, lad! Show me the secret hiding-place for which skilled men have searched in vain.

ROGER: I saw my father here, sir.

HOLDFAST: Here! Is he behind these walls, then?

ROGER: 'Twas here I saw him. I sleep here, and Nan, too. I was in my bed when father came. Points. The bed is there. He stood by my side.

HOLDFAST: sternly Child, art playing with me?

ROGER: The last time I saw my father was last night in a dream.

NAN: Nan had no dream!

ROGER: Babes have no dreams. I saw my father in a dream! 'Tis truth!

HOLDFAST: Wert thou the son of a godly man, England might know a great man. Micah Holdfast hath had enough of questioning babes.

ROGER: Sir, you have not hurt me!

HOLDFAST: I have done with thee! Go and play! Goes out.

ROGER: running to his mother Nay; I will care for my mother. See how weary she is! Come, rest in the great chair, and I will keep guard, as a soldier can, over you until my father comes again!

Mistress Sidney sits; the children gather about her.

CURTAIN

THE NEXT THINGS TO MAKE AND DO BEGIN ON PAGE 5657.

WHAT THIS STORY TELLS US

WASHINGTON IRVING'S Knickerbocker History of New York, from which this selection is taken, was published more than one hundred years ago. The work pretended to be written by an old Dutchman named Diedrich Knickerbocker, and described in humourous style the manners and customs of the early Dutch settlers of New Amsterdam, now New York. It gave sketches of the four Dutch governors Peter Minuit, Wouter Van Twiller, Wilhelm Kieft and Peter Stuyvesant. The descriptions are exaggerated, of course, but nevertheless have a basis of truth. This extract is taken from the chapter dealing with Wouter Van Twiller.

KNICKERBOCKER DAYS IN NEW YORK

THE modern spectator, who wanders through the streets of this populous city, can scarcely form an idea of the different appearance they presented in the primitive days of the Governor, Wouter Van Twiller. The busy hum of multitudes, the shouts of revelry, the rumbling equipages of fashion, the rattling of accursed carts, and all the spirit-grieving sounds of brawling commerce, were unknown in the settlement of New Amsterdam. The grass grew quietly in the highways — the bleating sheep and frolicsome calves sported about the verdant ridge where now the Broadway loungers take their morning stroll — the cunning fox or ravenous wolf skulked in the woods where now are to be seen the dens of Gomez and his righteous fraternity of money brokers — and flocks of vociferous geese cackled about the fields where now the great Tammany wigwam and the patriotic tavern of Martling echo with the wranglings of the mob.

In these good times did a true and enviable equality of rank and property prevail, equally removed from the arrogance of wealth, and the servility and heartburnings of repining poverty — and what in my mind is still more conducive to tranquillity and harmony among friends, a happy equality of intellect was likewise to be seen. The minds of the good burghers of New Amsterdam seemed all to have been cast in one mold, and to be those honest, blunt minds which, like certain manufactures, are made by the gross, and considered as exceedingly good for common use.

Thus it happens that your true dull minds are generally preferred for public employ, and especially promoted to city honours, — your keen intellects, like razors, being considered too sharp for common service. I know that it is common to rail at the unequal distribution of riches, as the great source of jealousies, broils, and heartbreakings; whereas, for my part, I verily believe it is the sad inequality of intellect that prevails, that embroils communities more than anything else; and I have remarked that your knowing people, who are so much wiser than anybody else, are eternally keeping society in a ferment. Happily for New Amsterdam, nothing of the kind was known within its walls — the very words of learning, education, taste, and talents were unheard of — a bright genius was an animal unknown, and a bluestocking lady would have been regarded with as much wonder as a horned frog or a fiery dragon. No man, in fact, seemed to know more than his neighbour, nor any man to know more than an honest man ought to know, who has nobody's business to mind but his own; the parson and the council clerk were the only men that could read in the community, and the sage Van Twiller always signed his name with a cross.

The person of this illustrious old gentleman was as regularly formed, and nobly proportioned, as though it had been modelled by the hands of some cunning Dutch statuary, as a model of majesty and lordly grandeur. He was exactly five feet six inches in height, and six feet five inches in circumference. His head was a perfect sphere, and of such stupendous dimensions, that Dame Nature, with all her sex's ingenuity, would have been puzzled to construct a neck capable of supporting it; wherefore she wisely declined the attempt, and settled it firmly on the top of his backbone, just between the shoulders. His body was of an oblong form, particularly capacious at bottom; which was wisely ordered by Providence, seeing that he was a man of sedentary habits, and very averse to the idle labour of walking. His legs, though exceeding short, were sturdy in proportion to the weight they had to sustain; so that when erect he had not a little the appearance of a robustious beer barrel, standing on skids. His face, that infallible index of the mind, presented a vast expanse, perfectly unfurrowed or deformed by any of those lines and angles which disfigure the human countenance with what is termed expression. Two small gray eyes twinkled feebly in the midst, like two stars of lesser magnitude in the hazy firmament; and his full-fed cheeks, which seemed to have taken toll of everything that went into his mouth, were curiously mottled and streaked with dusky red, like a Spitzenberg apple.

His habits were as regular as his person. He daily took his four stated meals, appropriating exactly an hour to each; he smoked and doubted eight hours, and he slept the remaining twelve of the four and twenty. Such was the renowned Wouter Van Twiller — a true philosopher, for his mind was either elevated above, or tranquilly settled below, the cares and perplexities of this world. He had lived in it for years, without feeling the least curiosity to know whether the sun revolved round it, or it round the sun; and he had watched, for at least half a century, the smoke curling from his pipe to the ceiling, without once troubling his head with any of those numerous theories, by which a philosopher would have perplexed his brain, in accounting for its rising above the surrounding atmosphere.

Such are the comfortable and thriving effects of a fat government. The province of the New Netherlands, destitute of wealth, possessed a sweet tranquillity that wealth could never purchase. There were neither public commotions, nor private quarrels; neither parties, nor sects, nor schisms; neither persecutions, nor trials, nor punishments; nor were there counsellors, attorneys, catchpoles, or hangmen. Every man attended to what little business he was lucky enough to have, or neglected it if he pleased, without asking the opinion of his neighbour. In those days, nobody meddled with concerns above his comprehension, nor thrust his nose into other people's affairs; nor neglected to correct his own conduct, and reform his own character, in his zeal to pull to pieces the characters of others — but in a word, every respectable citizen ate when he was not hungry, drank when he was not thirsty, and went regularly to bed when the sun set, and the fowls went to roost, whether he were sleepy or not; all which tended so remarkably to the population of the settlement, that I am told every dutiful wife throughout New Amsterdam made a point of enriching her husband with at least one child a year, and very often a brace — this superabundance of good things clearly constituting the true luxury of life, according to the favourite Dutch maxim, that "more than enough constitutes a feast."

The houses of the higher class were generally constructed of wood, excepting the gable end, which was of small black and yellow Dutch bricks, and always faced on the street, as our ancestors, like their descendants, were very much given to outward show, and were noted for putting the best leg foremost. The house was always furnished with abundance of large doors and small windows on every floor; the date of its erection was curiously designated by iron figures on the front; and on the top of the roof was perched a fierce little weathercock, to let the family into the important secret which way the wind blew. These, like the weathercocks on the tops of our steeples, pointed so many different ways, that every man could have a wind to his mind; — the most stanch and loyal citizens, however, always went according to the weathercock on the top of the governor's house, which was certainly the most correct, as he had a trusty servant employed every morning to climb up and set it to the right quarter.

In those good days of simplicity and sunshine, a passion for cleanliness was the leading principle in domestic economy, and the universal test of an able housewife — a character which formed the utmost ambition of our unenlightened grandmothers. The front door was never opened except on marriages, funerals, new-year's days, the festival of St. Nicholas, or some such great occasion. It was ornamented with a gorgeous brass knocker, curiously wrought, sometimes in the device of a dog, and sometimes of a lion's head, and was daily burnished with such religious zeal, that it was ofttimes worn out by the very precautions taken for its preservation. The whole house was constantly in a state of inundation, under the discipline of mops and brooms and scrubbing brushes; and the good housewives of those days were a kind of amphibious animal, delighting exceedingly to be dabbling in water — insomuch that a historian of the day gravely tells us that many of his townswomen grew to have webbed fingers like unto a duck; and some of them, he had little doubt, could the matter be examined into, would be found to have the tails of mermaids — but this I look upon to be a mere sport of fancy, or what is worse a wilful misrepresentation.

The grand parlour was the sanctum sanctorum, where the passion for cleaning was indulged without control. In this sacred apartment no one was permitted to enter, excepting the mistress and her confidential maid, who visited it once a week, for the purpose of giving it a thorough cleaning, and putting things to rights — always taking the precaution of leaving their shoes at the door, and entering devoutly in their stocking feet. After scrubbing the floor, sprinkling it with fine white sand, which was curiously stroked into angles, and curves and rhomboids, with a broom, — after washing the windows, rubbing and polishing the furniture, and putting a new bunch of evergreens in the fireplace — the window shutters were again closed to keep out the flies, and the room carefully locked up until the revolution of time brought round the weekly cleaning day.

As to the family they always entered in at the gate, and most generally lived in the kitchen. To have seen a numerous household assembled around the fire, one would have imagined that he was transported back to those happy days of primeval simplicity, which float before our imaginations like golden visions. The fireplaces were of a truly patriarchal magnitude, where the whole family, old and young, master and servant, black and white, nay, even the very cat and dog, enjoyed a community of privilege, and had each a right to a corner. Here the old burgher would sit in perfect silence, puffing his pipe, looking in the fire with half shut eyes, and thinking of nothing for hours together; the goede vrouw on the opposite side would employ herself diligently in spinning yarn or knitting stockings. The young folks would crowd around the hearth, listening with breathless attention to some old crone of a negro, who was the oracle of the family, and who, perched like a raven in a corner of the chimney, would croak forth for a long winter afternoon a string of incredible stories about New England witches — grisly ghosts, horses without heads — and hairbreadth escapes and bloody encounters among the Indians.

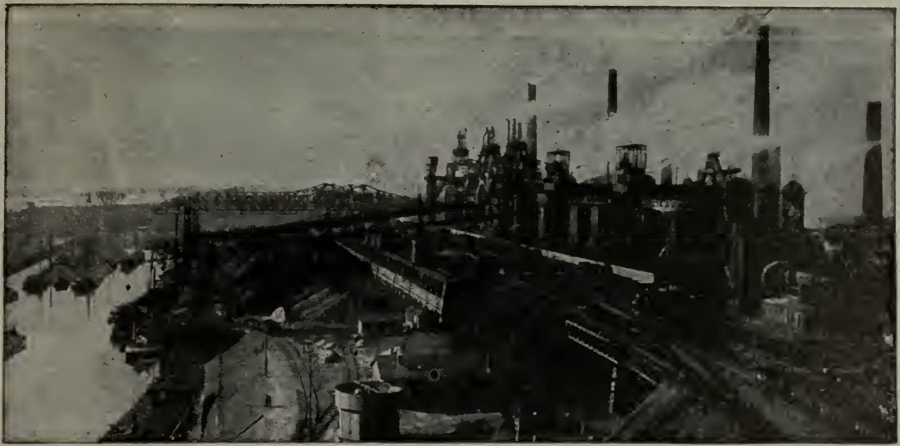
In those happy days a well-regulated family always rose with the dawn, dined at eleven, and went to bed at sundown. Dinner was invariably a private meal, and the fat old burghers showed incontestable symptoms of disapprobation and uneasiness at being surprised by a visit from a neighbour on such occasions. But though our worthy ancestors were singularly averse to giving dinners, yet they kept up the social bands of intimacy by occasional banquetings, called tea parties.

These fashionable parties were generally confined to the higher classes, or noblesse, that is to say, such as kept their own cows, and drove their own wagons. The company commonly assembled at three o'clock, and went away about six, unless it was in winter time, when the fashionable hours were a little earlier, that the ladies might get home before dark. The tea table was crowned with a huge earthen dish, well stored with slices of fat pork, fried brown, cut up into morsels, and swimming in gravy. The company being seated around the genial board, and each furnished with a fork, evinced their dexterity in launching at the fattest pieces in this mighty dish — in much the same manner as sailors harpoon porpoises at sea, or our Indians spear salmons in the lakes. Sometimes the table was graced with immense apple pies, or saucers full of preserved peaches and pears; but it was always sure to boast an enormous dish of balls of sweetened dough, fried in hog's fat, and called doughnuts, or olykoeks — a delicious kind of cake, at present scarce known in this city, excepting in genuine Dutch families.

The tea was served out of a majestic delft teapot, ornamented with paintings of fat little Dutch shepherds and shepherdesses tending pigs — with boats sailing in the air, and houses built in the clouds, and sundry other ingenious Dutch fantasies. The beaux distinguished themselves by their adroitness in replenishing this pot from a huge copper teakettle, which would have made the pigmy macaronies of these degenerate days sweat merely to look at it. To sweeten the beverage, a lump of sugar was laid beside each cup — and the company alternately nibbled and sipped with great decorum, until an improvement was introduced by a shrewd and economic old lady, which was to suspend a large lump directly over the tea table, by a string from the ceiling, so that it could be swung from mouth to mouth — an ingenious expedient which is still kept up by some families in Albany; but which prevails without exception in Communipaw, Bergen, Flatbush, and all our uncontaminated Dutch villages.

At these primitive tea parties the utmost propriety and dignity of deportment prevailed. No flirting or coquetting — no gambling of old ladies, nor hoyden chattering and romping of young ones — no self-satisfied struttings of wealthy gentlemen, with their brains in their pockets — nor amusing conceits, and monkey advertisements, of smart young gentlemen with no brains at all. On the contrary, the young ladies seated themselves demurely in their rush-bottomed chairs, and knit their own woollen stockings; nor ever opened their lips, excepting to say, yah, Mynheer, or yah, Vrouw, to any question that was asked them; behaving, in all things, like decent, well-educated damsels. As to the gentlemen, each of them tranquilly smoked his pipe, and seemed lost in contemplation of the blue and white tiles with which the fireplaces were decorated; wherein sundry passages of Scripture were piously portrayed — Tobit and his dog figured to great advantage; Haman swung conspicuously on his gibbet; and Jonah appeared most manfully bouncing out of the whale.

The parties broke up without noise and without confusion. They were carried home by their own carriages, that is to say, by the vehicles Nature had provided them, excepting such of the wealthy as could afford to keep a wagon. The gentlemen gallantly attended their fair ones to their respective abodes, and took leave of them with a hearty smack at the door; which, as it was an established piece of etiquette, done in perfect simplicity and honesty of heart, occasioned no scandal at that time, nor should it at the present —if our great-grandfathers approved of the custom, it would argue a great want of reverence in their descendants to say a word against it.



A great modern ironworks, showing the furnaces and the wharf at which the iron ore is landed.

MAKING IRON AND STEEL

THE WONDERFUL SIGHT IN OUR GREAT FURNACES

CONTINUED FROM PAGE 5475

PERHAPS the boys and girls of to-day do not realise that people did not always have buildings like those we see around us everywhere, nor such great iron bridges as now span our rivers. War ships and guns such as we now have were never thought of a few years ago, and our ocean steamships are gigantic affairs compared to those of former times. So, too, our powerful machinery, steel rails, and cars, and many other things made of iron and steel that I wish I could tell you of, are all bigger and better than those people were used to not so long ago. This all comes about because of the improvements in the making of iron and steel.

Iron and steel are now the commonest and cheapest of all the metals, you know. But this was not always so. The metals gold, silver, and copper were used by the ancients long before anything was known of iron. I think you will easily see why this was so when I tell you that iron is never found in a native state as we find gold, silver, and copper. A man might dig for a lifetime deep down into the earth and never come across any iron. This is because it is always found in combination with some other element and must be reduced, in order to be of any use to us. Now the Greeks had discovered how to reduce the ore to make iron and no doubt the Romans learned of them. The people of Great Britain, too, had found a way to produce iron, for when the Romans came to England they found iron works in the Forest of Dean. Of course the methods of all these people were crude and primitive when compared with our way of doing it to-day. You know in order to reduce the ore to iron it must be placed in a furnace with fuel and a blast of air strong enough to increase the heat until the ore melts. The Greek and the Roman way was to heat the ore to a melting point in a furnace which was nothing more than a pit surrounded by walls of clay about a foot high. The fuel for this crude furnace was charcoal. Layers of broken iron ore and charcoal were placed alternately in the furnace until the hole was filled, when a layer of charcoal was heaped over all. A rude form of bellows made from skins furnished the blast. After some hours of firing the melted ore and cinders were found in a lump at the bottom of the furnace,

Copyright, 1911, by Educational Book Co.

The cinders being lighter than the ore settled on top of the mass, when the iron worker broke off this cinder lump from the bloom and what remained was iron. The iron made in this way was very good indeed, but the great cinder heaps left in Yorkshire by the Romans show us that much good material was wasted. In fact the cinder heaps contained so much iron that they served as ore for twenty furnaces working constantly for about three centuries. Crude and primitive as was this method of these people, they, nevertheless, found out the fundamental principles for reducing iron.

In the year 1624 a little colony of Englishmen living at Jamestown built furnaces there on the banks of Falling Creek, and produced the first iron made on this continent. This started the iron production in America, and later it was taken up by the states of Massachusetts and Connecticut. Rhode Island soon followed their example, for much " bog " and " pond " ore was found in these eastern states. Furnaces were built at that time close to the source of the iron ore and the forests which served or furnished the fuel; and this section soon became the centre of the iron industry in the New World.

As I have told you, charcoal or burnt wood was the only fuel used at that time. The English, alarmed at the rapid destruction of their forest, were asking what they would do for fuel for their furnaces when the timber was all used up, in much the same way as we are asking to-day what we shall do for fuel when our coal fields give out. They were forced to look for something to take the place of charcoal. Coal was suggested as a substitute, but people laughed at the idea that coal could do the work of heating the furnace as well as what they had been using. Coal had been tried for the smelting of iron but the plan was not understood. We know now it failed because coal was too soft to stand the weight of the iron ore when placed upon it. The weight packed the coal so tight that the air could not find its way through the mass and this prevented the combustion which is necessary to produce a temperature during the smelting process. However, during the process it was observed that much of the coal that was heated burned into coke. This coke showed the power to hold up the ore without being crushed, just what coal was unable to do. From that time coke was the fuel and remains the fuel to-day for smelting ores in furnaces everywhere.

In the United States, however, the conditions were different. The forests were large and afforded plenty of timber for making charcoal. In fact, it was so plentiful that charcoal was used here for fifty years after the English had begun to use coal, and the product from furnaces was so much better than that of the coal furnaces that the Americans were encouraged to ship their charcoal iron-metal to England. In time, though, the Americans were forced to face the same problem about their timber as the English had met. Fortunately, at about this time coal was discovered in the new country and the attention was turned to its manufacture into coke, for its use in the growing iron industry.

In 1819 and again in 1841 the attempt had been made with too little success to warrant its adoption. To encourage experimenting, in 1835, the Franklin Institute of Pennsylvania offered a premium of a gold medal to the person who should manufacture in the United States the greatest quantity of iron from ore during the year using no other fuel than bituminous coal. The history of coke-making is one of a series of trials and failures and it was not until 1880 that it was generally accepted as a fuel.

THE COAL AND IRON BELT, OR WHERE THE COAL AND IRON ARE FOUND

The greatest iron ore region in this continent lies near the shores of Lake Superior. The picture here shows an open pit iron mine of the famous Mesaba Range near Lake Superior in Minnesota. One can see how readily the ore can be taken from the open pit by steam shovels and deposited at once in the cars. These deposits are 300 feet deep in some places. A single mine in Minnesota is said to have produced 1,681,000 long tons in one year, more than was pro duced in all America before 1854. One would naturally expect the iron industries to be placed near these pits, but this is not the case. The great iron manufacturing centres are Pennsylvania, Ohio, Illinois, New York, West Virginia, and Virginia, where little or no iron is found, and all the iron ore must be shipped from ports on the shores of Lake Superior to these places.

If you follow the line of the bituminous coal belt, from which all coke is made, you will see that it runs through the states I have just mentioned. This is called the Appalachian coal belt and is about 800 miles long and about 150 miles wide and contains within its border or compass all the great centres of our iron and steel industries. In fact these industries will be found to lie close to the source of the fuel rather than the source of the ore.

HOW THE FUEL IS MADE THAT SUPPLIES THE GREAT IRON FURNACES

Success in the iron and steel industries is due to the making of coke out of coal, but not until the year 1880 did the manufacture of coke mean much to the iron industry. Before that time very little coke was made in the United States. However, the industry for making coke out of soft coal in what is called a Beehive coking oven has now attained a position of importance. The name of the oven was no doubt suggested from its resemblance to the ancient dome-shaped beehive.

These ovens have an opening at the top through which five tons or more of coal is dumped. This charge of coal falls on the bottom of the oven, and is then lighted by placing shavings of wood on the top of the heap. The process of fusing and coking now begins on the top surface of the charge of coal and goes down through the mass. It takes about forty-eight hours to burn this five tons of coal into coke. The gases formed during the burning process, passing upwards through the mass, deposit carbon. This gives to the coke the bright silvery coating which is the distinguishing mark of the best coke for smelting ores in blast furnaces.

THE BLAST FURNACE

This furnace is the first step in the making of iron and steel, and we shall now tell you something about it. It is a tall cylindrical iron or steel shell, seventy-five and sometimes one hundred feet tall, lined with fire brick on the inside. The fuel for this furnace is coke, which is the blast furnace fuel everywhere. Nearly all the coke manufactured to-day is burned up to make heat for melting the ore into pig iron.

The description of the blast furnace as given under the picture will tell you all about its structure. You will learn, too, that the product of this furnace is pig iron, the raw material for the puddling furnace, which produces wrought iron, and for the cupola furnace, which produces cast iron, the Bessemer Converter for the making of soft steels, and the open hearth furnaces for carbon steels and the crucible furnace for high carbon or tool steels.

THE PUDDLING FURNACE

In 1784, Henry Cort invented the puddling furnace for the reducing of pig iron by a coal-heated process. Wrought iron, the product of this furnace, is very tough metal and will stand shocks but is easily welded. If you will look at the picture shown here, you will see a furnace not unlike the open hearth furnace also shown. Now if you take pig iron as it comes from the blast furnace and put it on the hearth of the furnace I have just told you of, and build a fire in the fire box which lies in the end of the furnace, using coal, and watch the fire as it increases in temperature, you would see the gases from the coal light up just as they rise to the top of the furnace on their way to the chimney. This heats the mass of pig lying upon the hearth. In a little while the iron begins to melt and the slag forms little pools on the bottom of the furnace. In about an hour the puddler stirs the whole mass with a long bar of iron called a rabbling bar. He keeps the temperature of the metal just below the melting point. At this temperature iron is in a pasty condition. By rolling it around he forms a ball weighing from 150 to 200 pounds. He is careful to see that the metal does not get too hot, for, if it should, it could not be gathered into a ball. So the heat is regulated by opening and closing the damper on top of the chimney. When the ball is made it is taken out of the furnace by the aid of a pair of tongs and placed on a buggy, and rushed off to the squeezer, where all the slag or impurities are squeezed out of it. Then it is put between the rollers and reduced to the proper size. This is called wrought iron and is placed on the markets of the world to be sold for making chains, grills, horse-shoes, bolts, nuts, car handles, steps, and the like.

THE FURNACES THAT MAKE STEEL FOR GUNS AND ARMOUR PLATE

The product of the open hearth furnace is a very fine steel, out of which is made armour plate used on war vessels. Large guns are made from this steel, steel castings, large propeller shafts for vessels, crank shafts, and also most of the steel used on automobile forgings are made from this product. When you visit a steel mill where these furnaces are in operation you will see that the charging door is about fifteen or twenty feet above the floor level. The brick work below the furnace hearth is built up in a checker system, through which the gases rise, and are heated before reaching the melting zone. The fuel used for the open hearth furnace is coal gas. It is the gas that is heated to a white heat on its way to the melting zone. This, you see, keeps the furnace in a very high temperature all the time, for there is no cold air of any kind entering the furnace while the furnace is in operation. In many ways this furnace is the most satisfactory of any mentioned for producing large quantities of steel. The molten metal can be held in this furnace any number of hours during which time tests can be made until the required carbon point is determined. This assures a constant quality of steel.

THE CONVERTER THAT CHANGED THE WHOLE HISTORY OF STEEL-MAKING

The pictures and the description tell the story of Sir Henry Bessemer's great invention for changing pig iron into steel without the use of fuel. Molten cast iron is put into the converter. The blast added to the heat already in the cast iron, increases the heat enough to burn all the impurities out of the molten mass. This makes a steel that is used for building material, bridges, steel cars, vehicles, railroad rails, fire escapes, grills, and is now replacing wrought iron for many things. It has no fibre like that of wrought iron, but can be twisted, bent, drawn out and shaped to any desired form without danger of breaking. Many blacksmiths prefer this steel to wrought iron for their work.

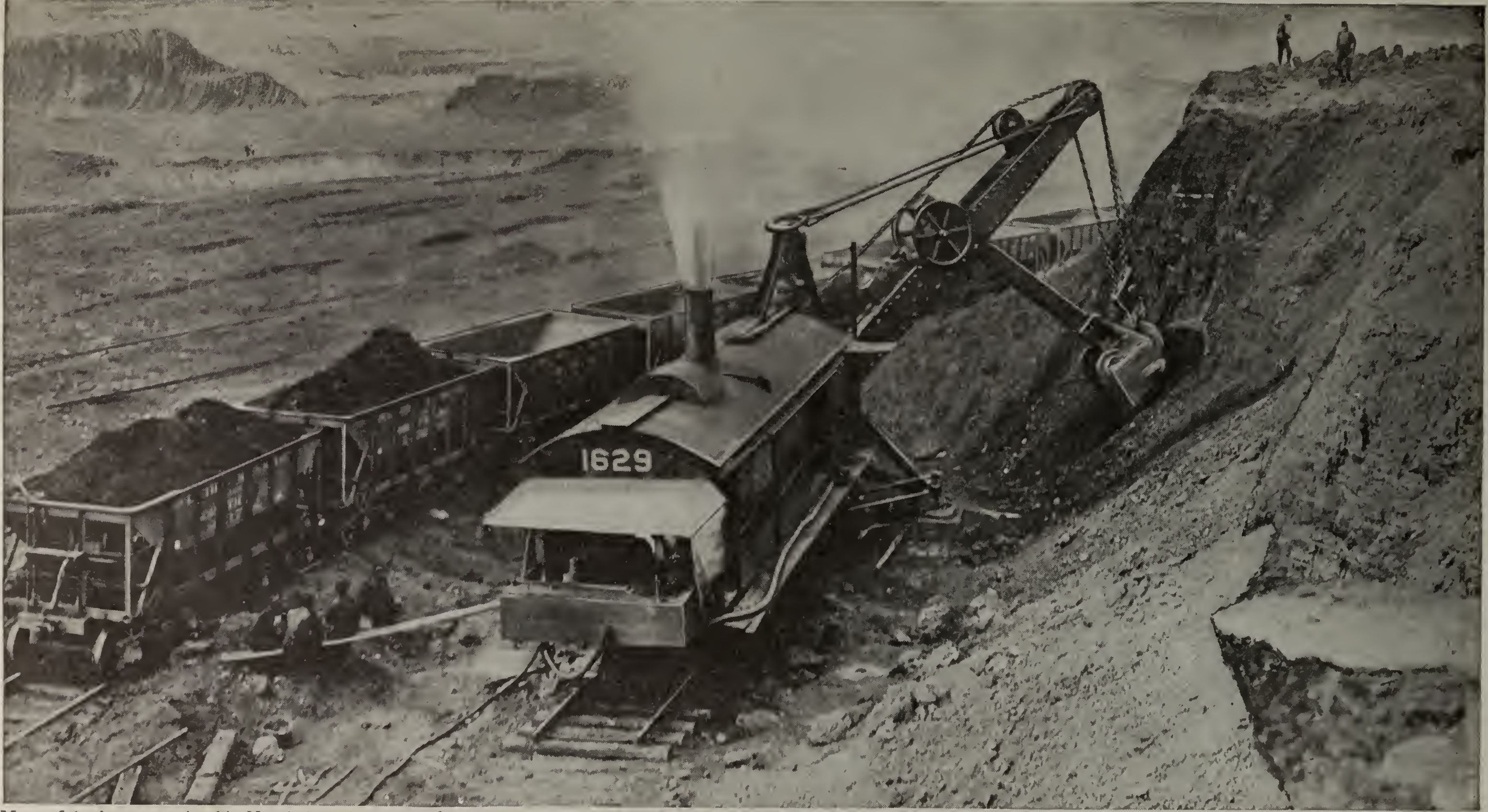
THE STEEL THAT IS USED FOR THE CUTTING TOOLS OF THE WORLD

Crucible steel is found in the market under four different names. It is sometimes called (1) crucible steel, because it is melted in a graphite pot or crucible; (2) high carbon steel because it contains more carbon than any of the steels, (3) cast steel because it is cast into ingots and hammered into shapes for the market; (4) tool steel because all cutting tools are made from it, including our table cutlery, butcher knife blades, pocket knife blades, files, surgical instruments, and the like.

The method of manufacturing this steel is one of the simplest, yet great care must be exercised during the melting process. Refined iron is placed in a graphite pot or crucible with a certain amount of carbon. The crucible is then placed in the melting pit, which is a hole made in the ground, about four feet deep, lined with fire brick. The fuel for melting the metal in these pots is gas, preheated in the same way as was that of the open hearth furnace. It takes about three hours for the metal to melt and during that time the temperature of the furnace reaches 3000° F. You can see that men who have this kind of work to do must be trained especially for the purpose. Their work days are from four to five hours and during that time they are dressed either in asbestos clothing or in overalls saturated with water. This is done to keep the heat away from their bodies while lifting the pots up from the pits. If they were not strong they could not stand the intense heat. It is the skill required in handling the hot metal just at the right time and the difficulty in making men fit to do this work that keeps tool steel at the high price asked.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 5585.

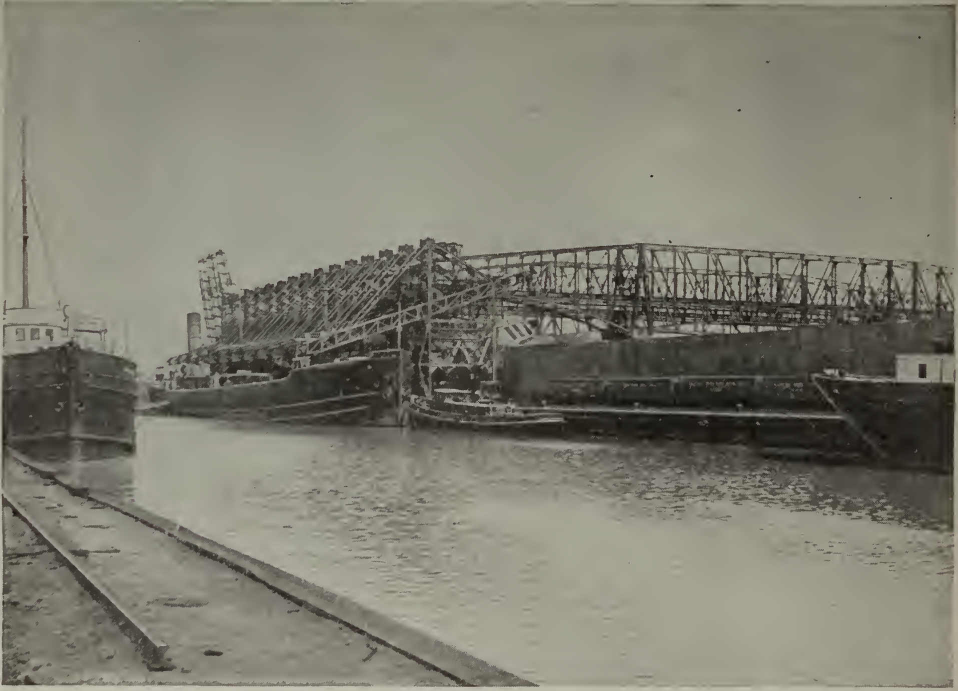
THE OPEN PIT MINE FROM WHICH THE ORE COMES



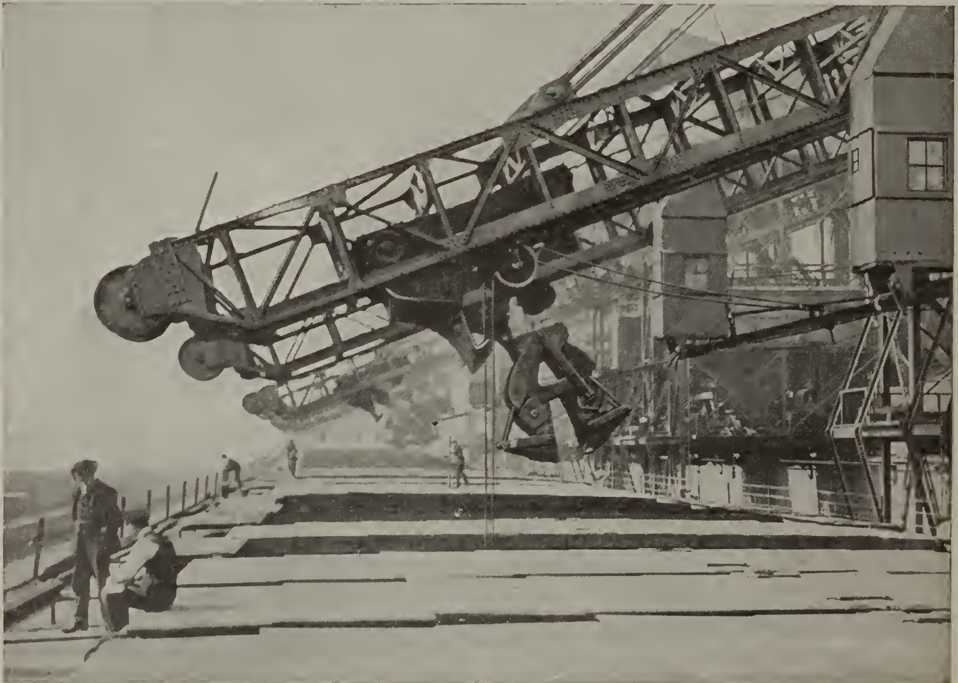
Most of the iron ore mined in North America comes from the open pit mines of the Lake Superior region. The deposits are sometimes three hundred feet deep and seem almost inexhaustible. Here you see a steam shovel digging into the bank and loading the cars. In another place we show how the steam shovel is at work digging the Panama Canal. One of these machines does more work than a thousand men could do with picks and shovels. In the next pictures we shall follow the ore to the furnaces.

Picture by courtesy of the Illinois Steel Co.

FOLLOWING THE ORE TO THE FURNACE



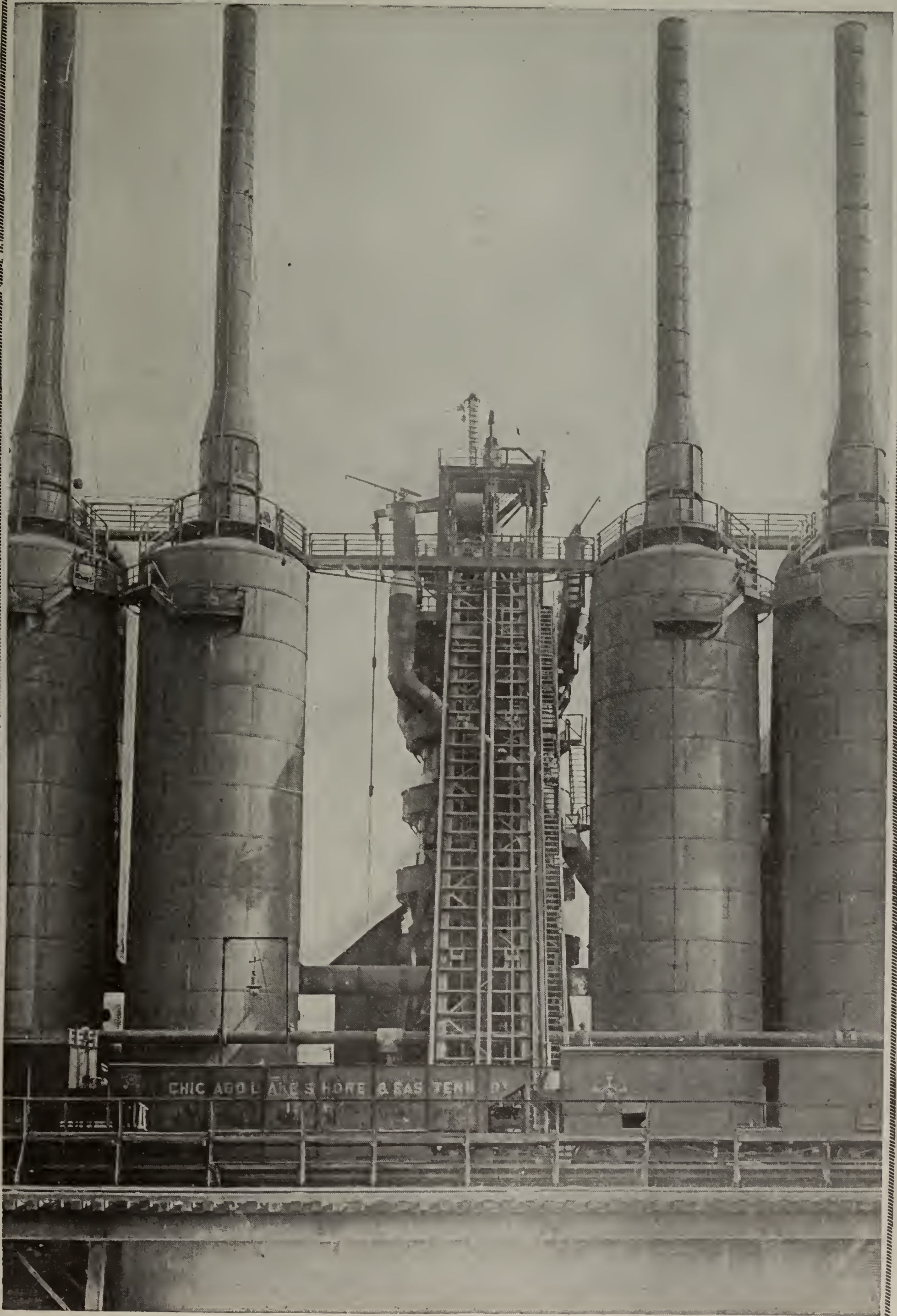
The iron ore which the steam shovel loads into the cars is then transferred to great ore ships which carry it either to the furnace or to another transfer point. Here we see one of the ships which is being unloaded.



Think how long it would take to unload one of these ships by means of shovels. This is one of many scoops which, when let down into the ship, gather up hundreds of pounds of ore, and is quickly run back where it can dump its load and come back for another.

Pictures by courtesy of the Illinois Steel Co.

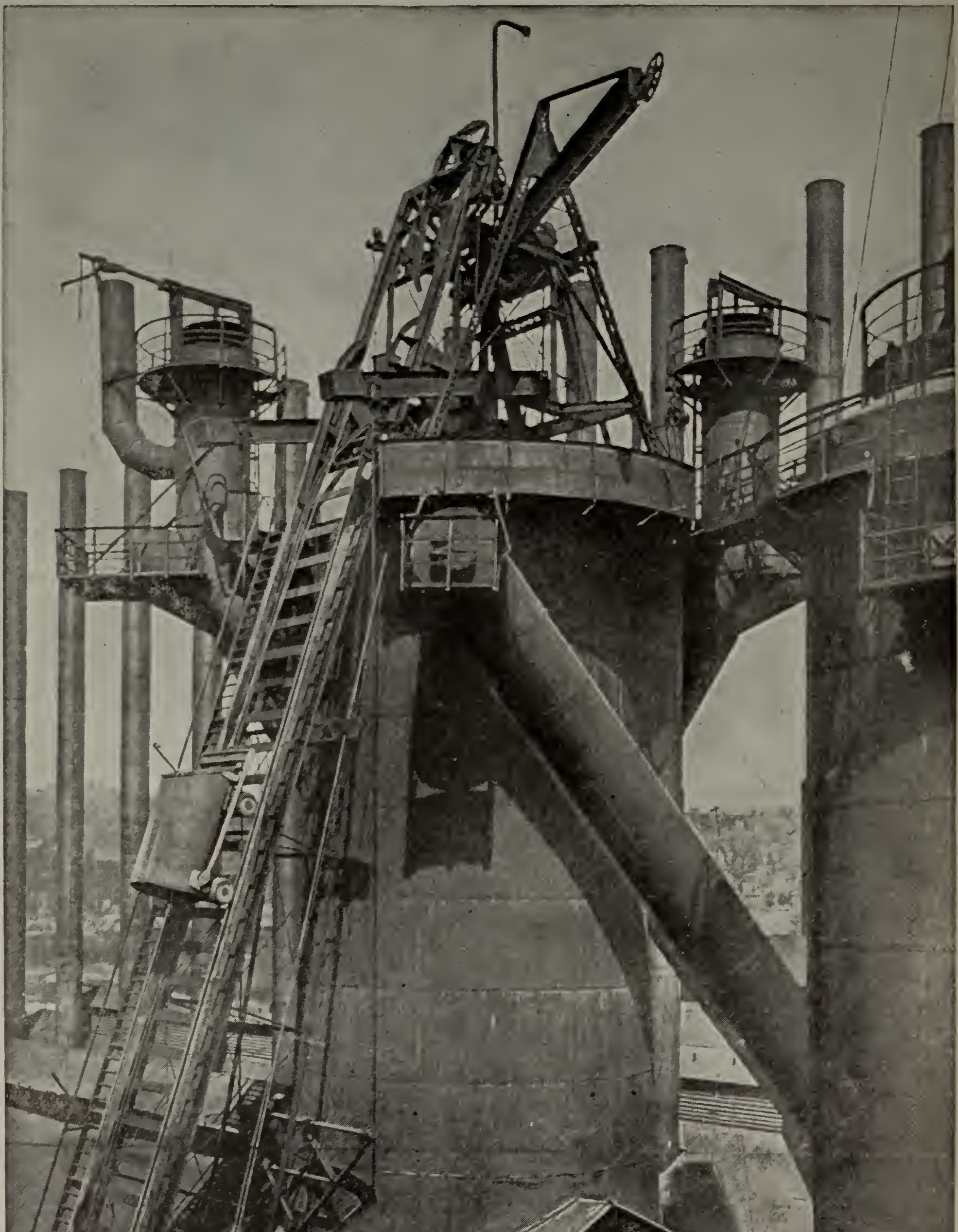
THE GREAT BLAST FURNACES



Now we come to the great steel works, the name of which you would recognise if we were to tell you. Here is a row of the blast furnaces which are fully described later when we show you the top of one and a diagram of the interior of another. In the centre is the hoist which raises the ore, the coke and the limestone to the top where they are fed into the great monsters.

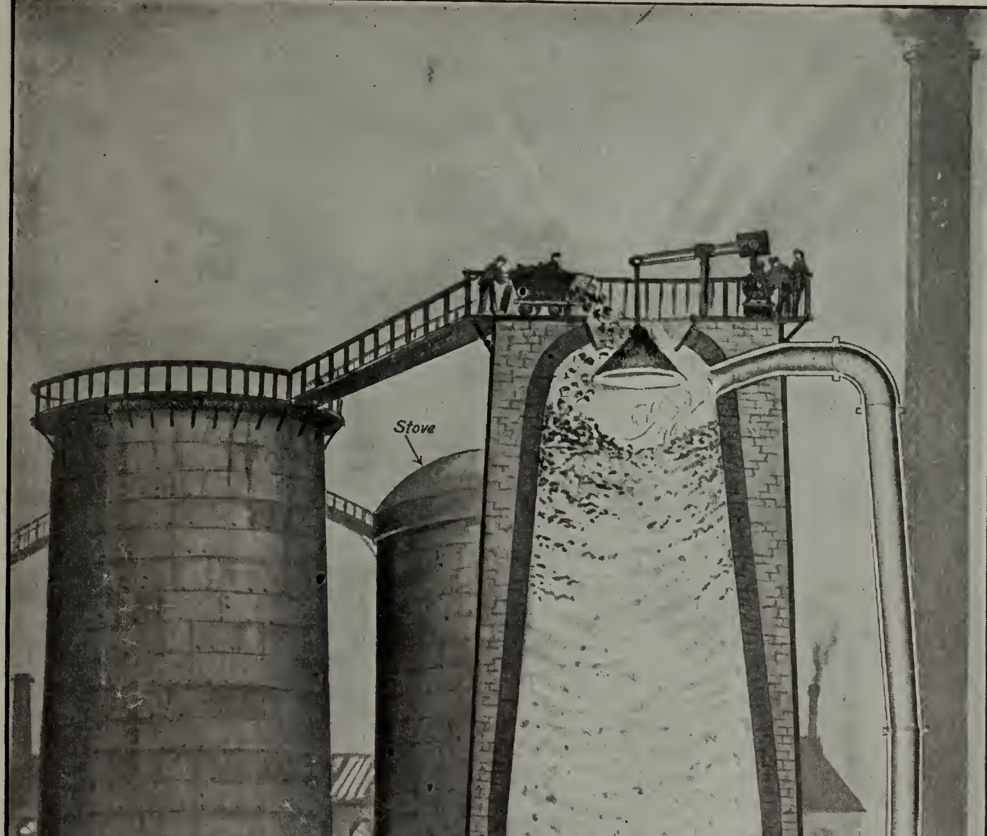
Picture by courtesy of the Illinois Steel Co.

THE TOP OF A MIGHTY BLAST FURNACE



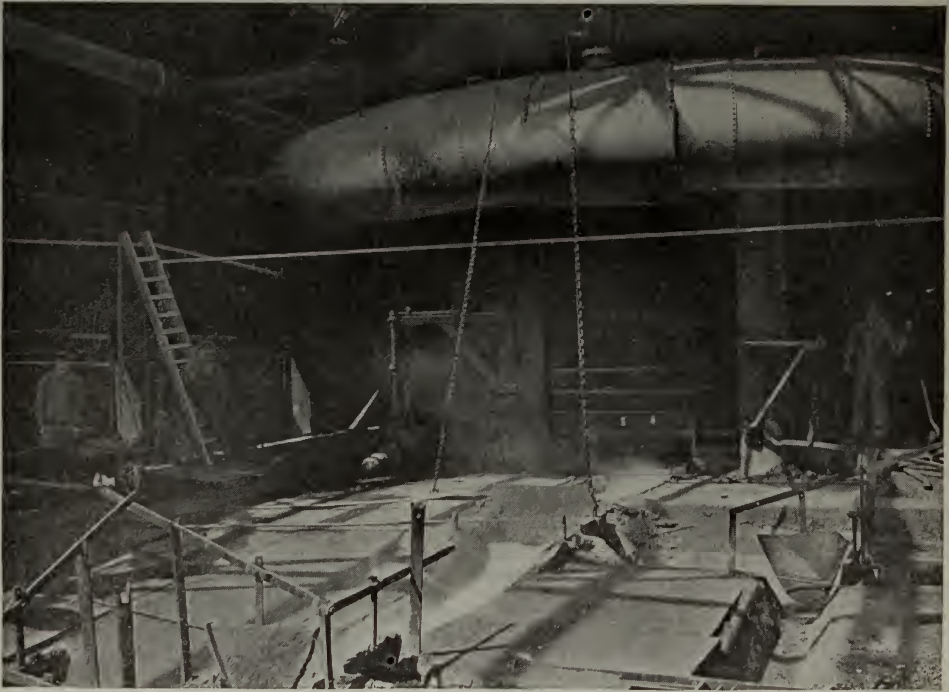
Here we see the top of one of the huge blast furnaces in which the ore is melted and the pig-iron produced. Pig-iron is really cast iron, and it received its name because, when it was run into trenches lying side by side, it was jokingly said to resemble a number of little pigs. The rough iron ore is pulled to the top of the furnace in great buckets, as shown in the picture. The blast furnaces are often 100 feet high and 120 feet round inside, and each one can produce 700 tons of pig-iron in a day. When once the fire is started it is kept going for years, and if by accident it goes out and the molten iron inside becomes solid, the whole furnace has to be pulled down and rebuilt at a cost of thousands of dollars. Over 50,000,000 tons of pig-iron are produced in the world in a single year.

THE FIRE THAT MELTS IRON

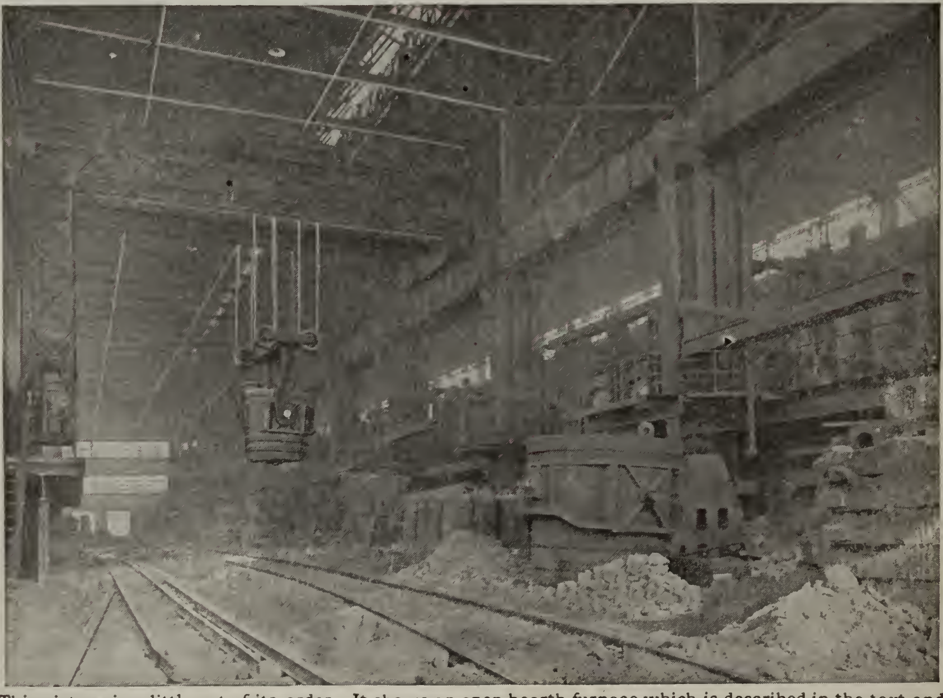


This diagram shows the beginning of iron and steel. The ore dug out of the earth is carried to the top of the great shaft, in which a huge fire is burning. The lid of the furnace is lowered as seen, and the ore falls into the fiery furnace. There it lies, in the greatest heat that men can produce by fire. The lid closes, and the gases rush into the pipe on the right and into the stove, where they help to drive machinery. This machinery, in turn, forces hot air into the bottom of the furnace through the little entrance that we see, and the tremendous force of this hot air rises through the heart of the fiery furnace and melts the iron out of the rock, until it trickles like water. At the bottom of the furnace the melted iron collects. and every few hours the "tap hole" is opened and the white-hot iron runs into the groove along the ground, and from this into other grooves called "sand moulds," because they are cut out in sand. Here these streams of iron lie still until they set hard and can be taken out as solid bars.

TWO INTERESTING PROCESSES



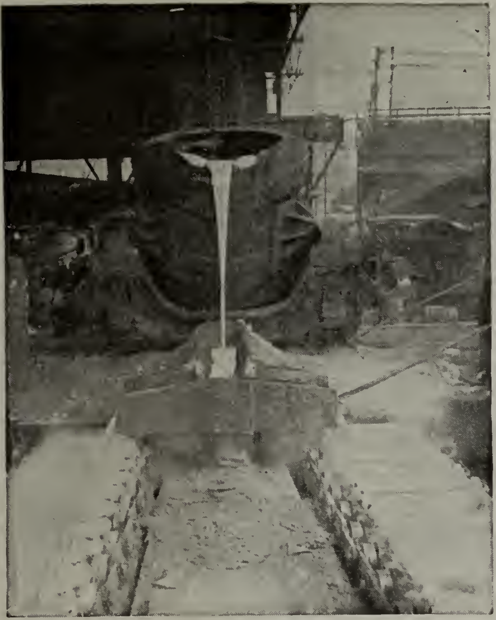
This picture shows the bottom of a blast furnace. The iron is divided. The slag or impurities run in one direction while the metal goes in the other. The melted iron is hauled to the endless-chain casting pig machine. When all the melted iron is tapped the hole at the bottom is plugged up with soft fire clay and remains so until enough is again melted down.



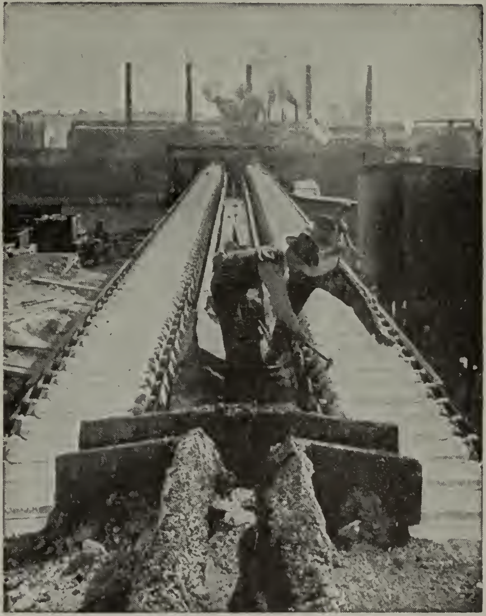
This picture is a little out of its order. It shows an open hearth furnace which is described in the text and another picture of which is shown on page 5549. Steel made by this process is used for many things.

Pictures by courtesy of the Illinois Steel Co.

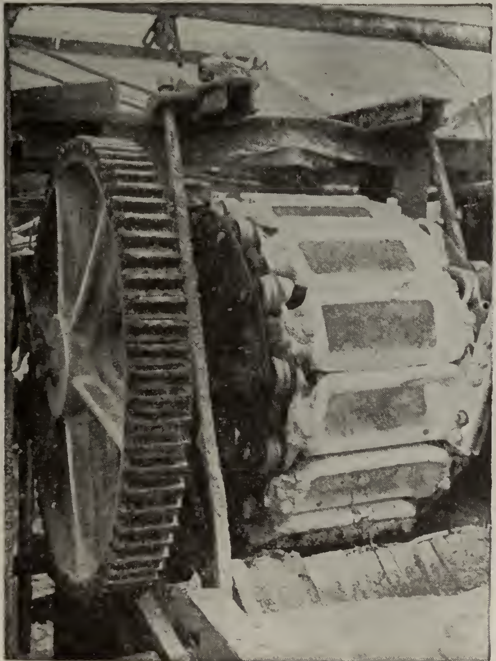
AN ENDLESS CHAIN OF WHITE-HOT IRON



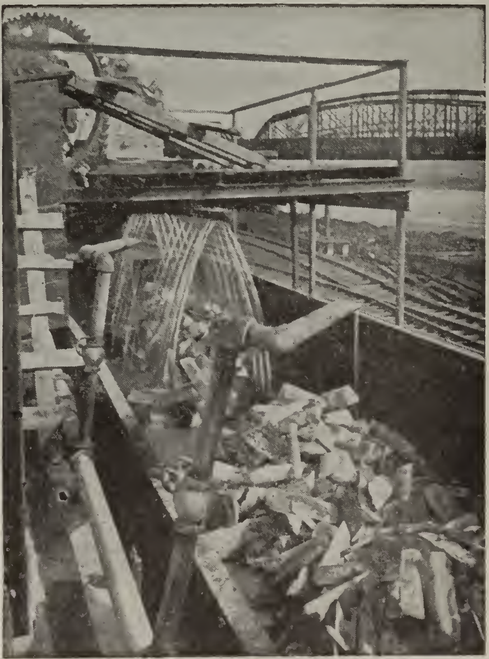
The improvements in the manufacture of iron have been marvellous, and three blast furnaces at a single foundry will now produce in one year as much pig-iron as was made by the whole world a century ago. In this picture molten pig-iron is being poured into moulds from a great ladle which received its fiery load direct from the furnace.



The most advanced ironworks make the pig-iron into ingots, as shown in these pictures. Instead of being run into sand trenches, the molten metal is tapped into a great vessel called a ladle. as seen in the first picture, and from this it is poured into a series of moulds in a double line. Sometimes the line of moulds is in a circle.



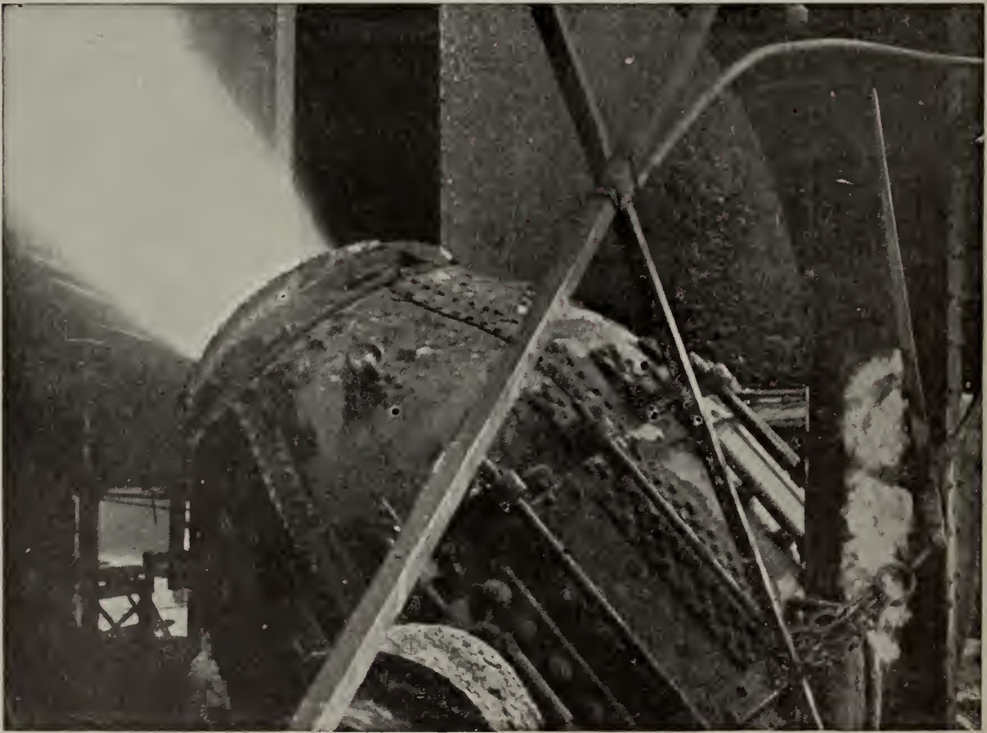
The moulds run upon endless chains, and as succeeding moulds are filled so the chain moves on. Then, when the metal has cooled sufficiently, the chain of moulds turns round a wheel, as shown in this picture, and the iron ingots fall into cars waiting to receive them. Although solid, they are still at a very high temperature.



As the hot ingots are loaded into the cars, they are played upon by sprays of cold water. In pig, or cast, iron about three parts of every hundred are carbon. Wrought iron has practically no carbon, and steel is between the two, having usually about one part of carbon in every hundred parts, although it varies considerably.

TWENTY TONS OF STEEL MADE IN TWENTY MINUTES

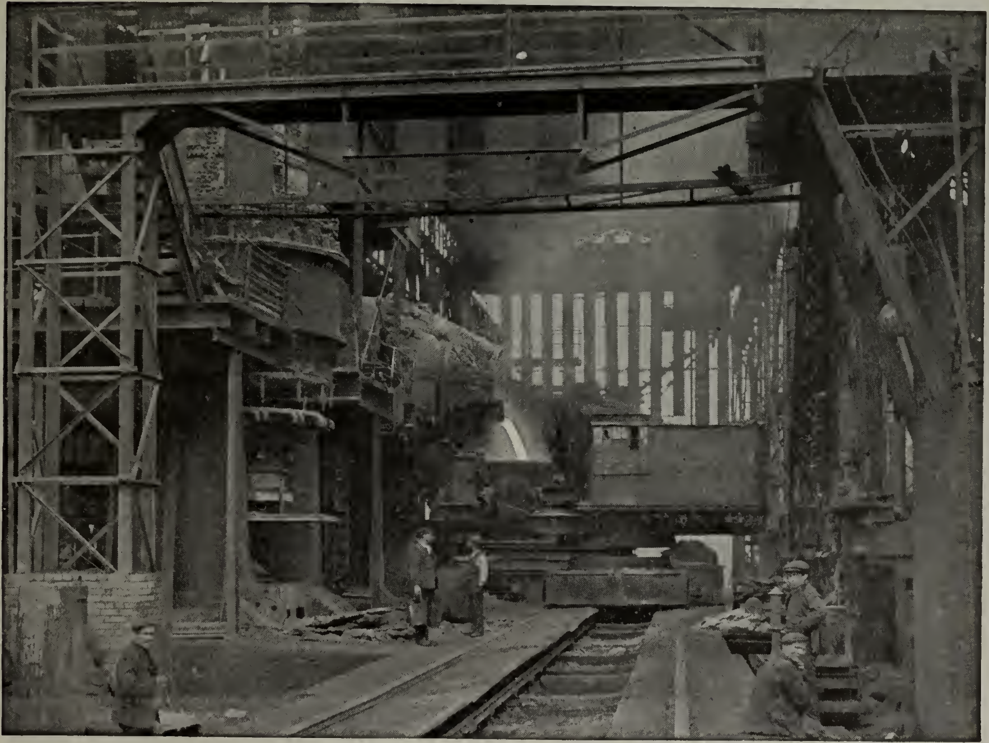
The first cheap and rapid process for making steel, a process by which more than half the world's steel is still made, is that known as the Bessemer process. It was invented by Sir Henry Bessemer, and greatly improved by David Mushet. Molten pig-iron is first of all poured into a vessel called a converter, as shown in this picture.



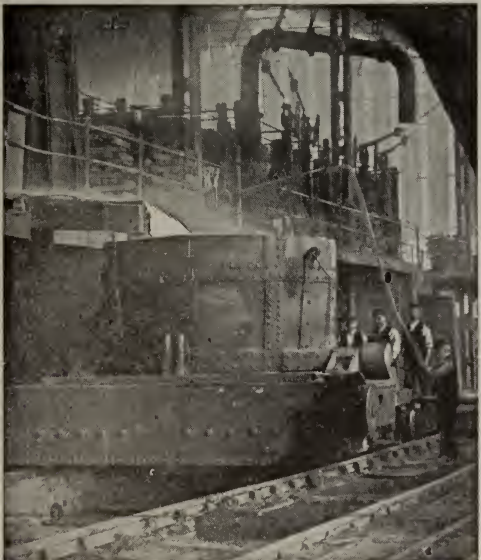
When the molten metal is in the converter, a blast of cold air is blown up through it in small jets. A roaring flame rushes from the mouth of the vessel, as can be seen here, and this is first of all violet, then orange, and then a dazzling white. Later, when the colour becomes a faint blue, all the carbon has been burnt up. Molten metal, containing the right proportion of carbon, is added, and the white-hot mass is at once converted into steel. The process takes less than twenty minutes, and a large Bessemer converter at a modern steel-works holds twenty tons.

Photographs copyright by H. C. White Co.

POURING OUT STEEL LIKE WATER



The huge converter works on trunnions, or pivots, and so soon as the steel is ready, the converter is turned and the liquid metal is poured into a great ladle, as easily as milk or water is poured from a jug into a cup. In this picture we can see the steel in process of being poured out. When the metal in the converter is at its greatest heat, the impurities in the iron, known as "slag," float at the top, and are often blown out during the blast as white-hot cinders.

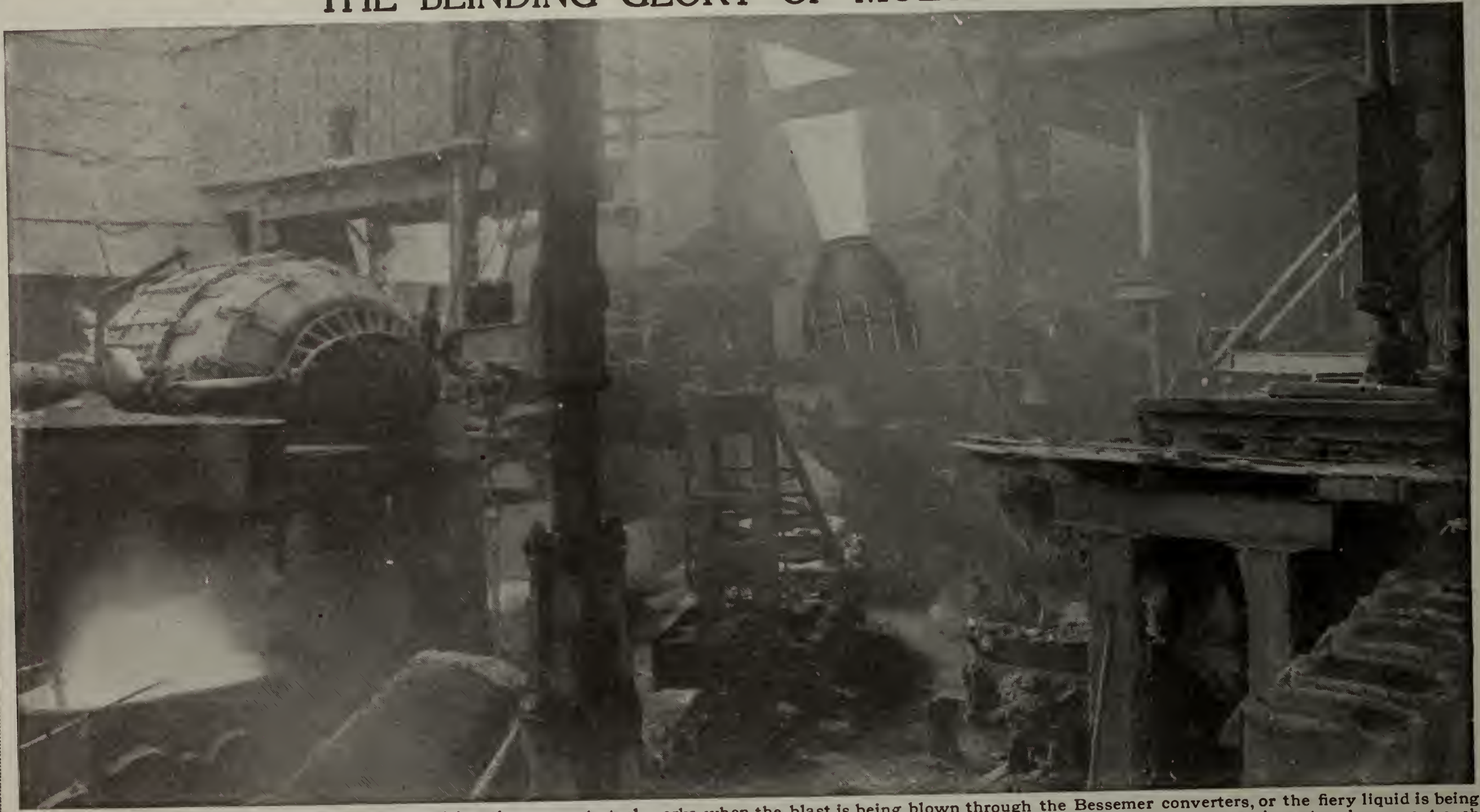


Another way of making steel is the open-hearth system, the first stages of which are shown on p. 5546. By this process, instead of burning up all the carbon in the iron and then adding the right quantity, as in the Bessemer process, only part of the carbon is burnt, and whatever is necessary is added. Here the steel is being tapped.

The huge ladle into which the molten steel has been poured, either from an open-hearth furnace or from a Bessemer converter, is then moved along by a great crane over a series of moulds, and a plug-hole in the ladle is opened so that in turn each mould may be filled. The great ladle in the picture holds more than seventy tons.

Copyright by H. C. White Co.

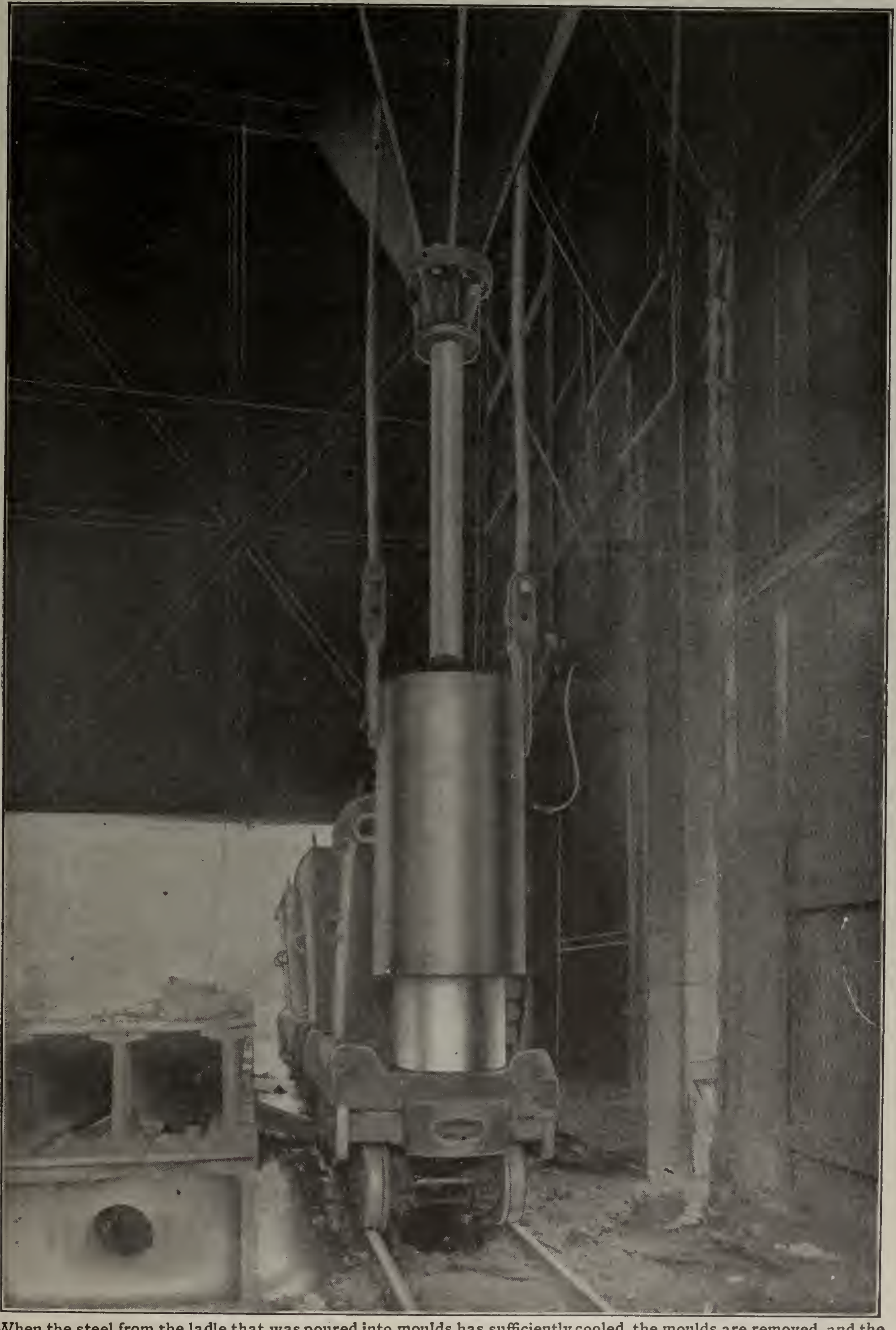
THE BLINDING GLORY OF MOLTEN STEEL



There are few sights more impressive or awe-inspiring than a great steel works when the blast is being blown through the Bessemer converters, or the fiery liquid is being poured out into ladles. It is in such a place and at such a time that one realizes the marvellous power and greatness of the mind of man, that can invent and carry out such tremendous processes. Here is liquid fire sufficient to destroy a city and slay ten thousand men if once it got loose, and yet, by sheer power of the human mind, it is under absolute control, and is handled as safely and with as little concern as the housewife handles milk. From this picture we get some idea of the wonder of molten metal.

Picture by courtesy of United States Steel Corporation

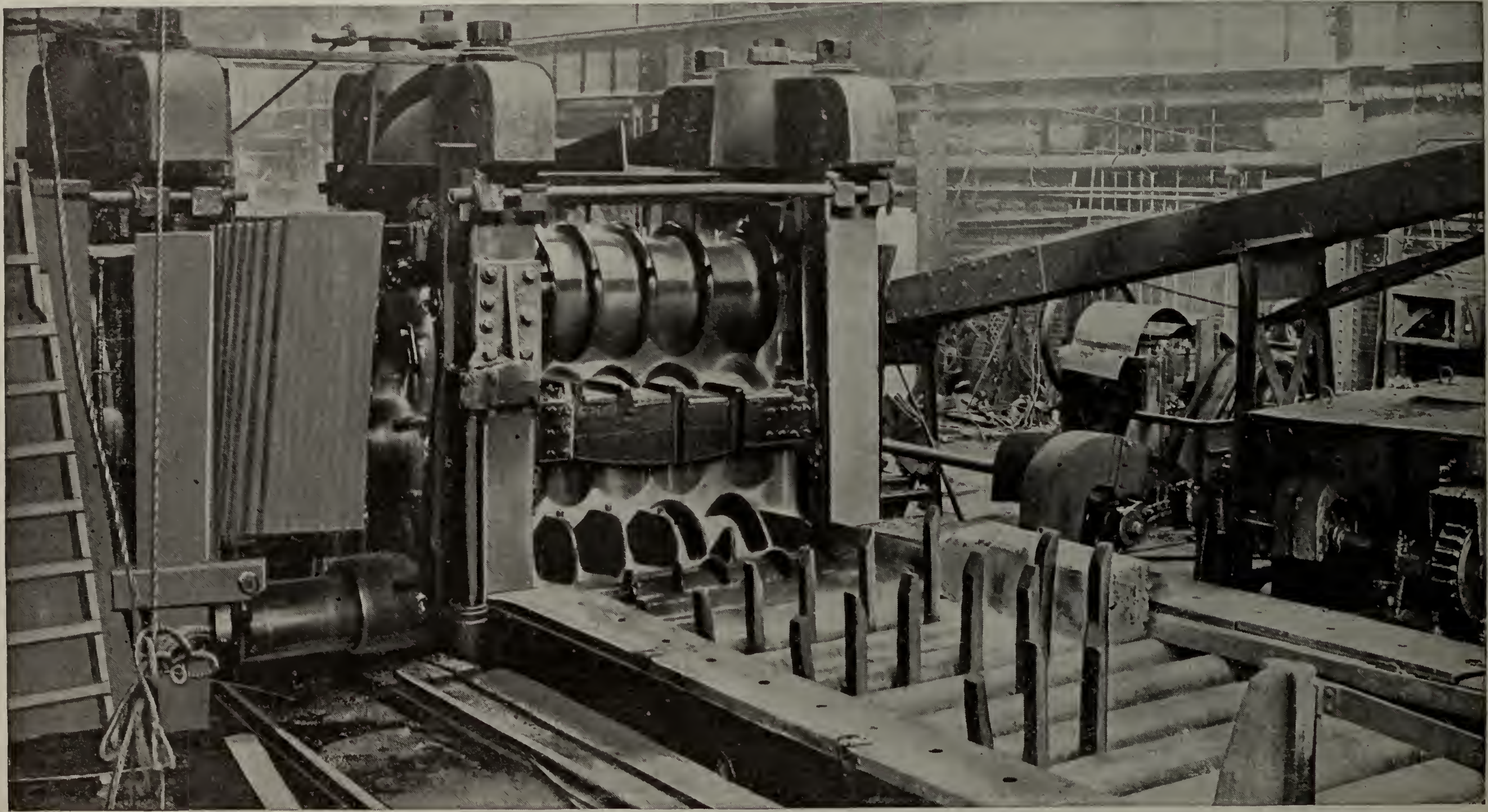
THE WONDERFUL TRAIN OF FIRE



When the steel from the ladle that was poured into moulds has sufficiently cooled, the moulds are removed, and the glowing ingots are taken by a train to the rolling-mills, the procession of fiery pillars presenting an extraordinary and striking sight, especially if it be dark. Iron and steel have been truly called "kings of the earth," for our modern civilisation is largely founded upon them, and were they removed entirely, the whole fabric of modern life would come down with a crash. If there has been a stone age and a bronze age, the present is, without doubt, the age of steel.

By courtesy of the United States Steel Corporation

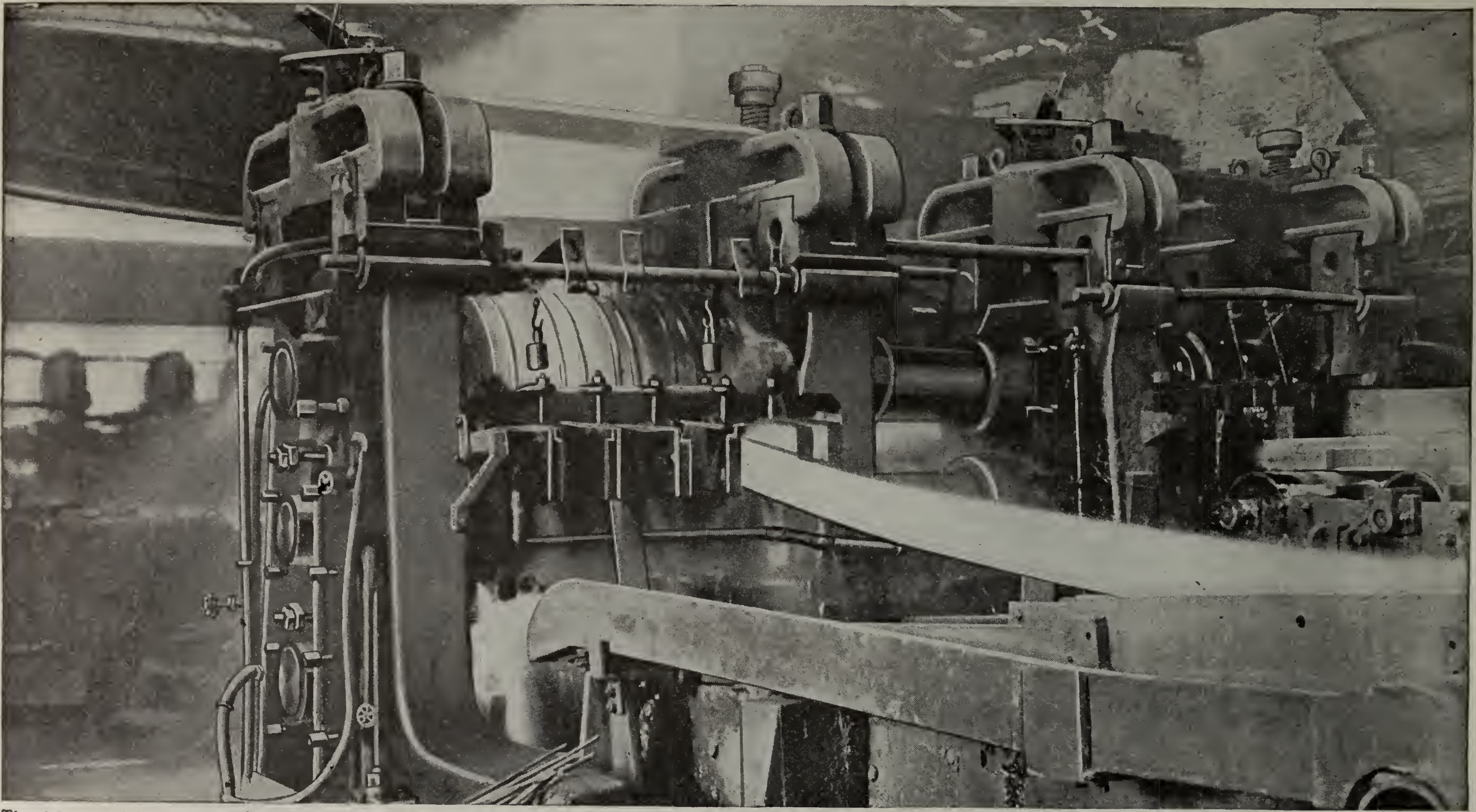
THE FIRST STEP IN THE MANUFACTURE OF STEEL RAILS



This picture shows the beginning of the manufacture of steel rails from ingots. The great ingot which you see after being heated to exactly the right temperature is forced between the first set of rolls which begin to reduce the size and increase the length. It comes out in the form of a beam, which then goes on to the next set of rollers.

Picture by courtesy of the Illinois Steel Co.

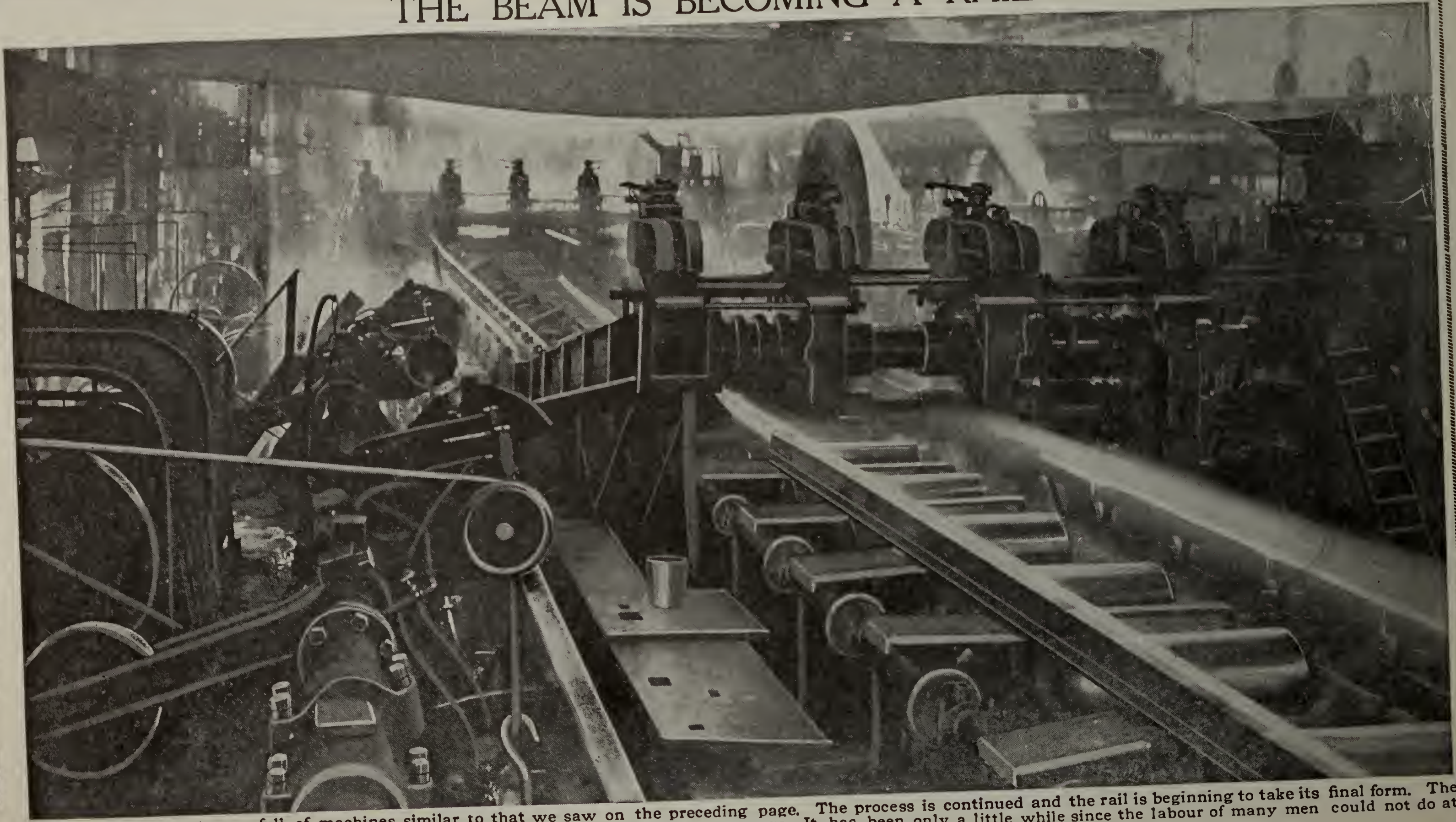
THE INGOT HAS BECOME A BEAM



The beam which has gone through the first set of rolls shown on the preceding page now is being drawn out into rails or beams for railways, bridges and even for use in high buildings. The intensely hot steel in the grasp of these machines is pressed and drawn as if it were so much butter. This is one of the most wonderful sights in a steel mill.

Picture by courtesy of the Illinois Steel Co.

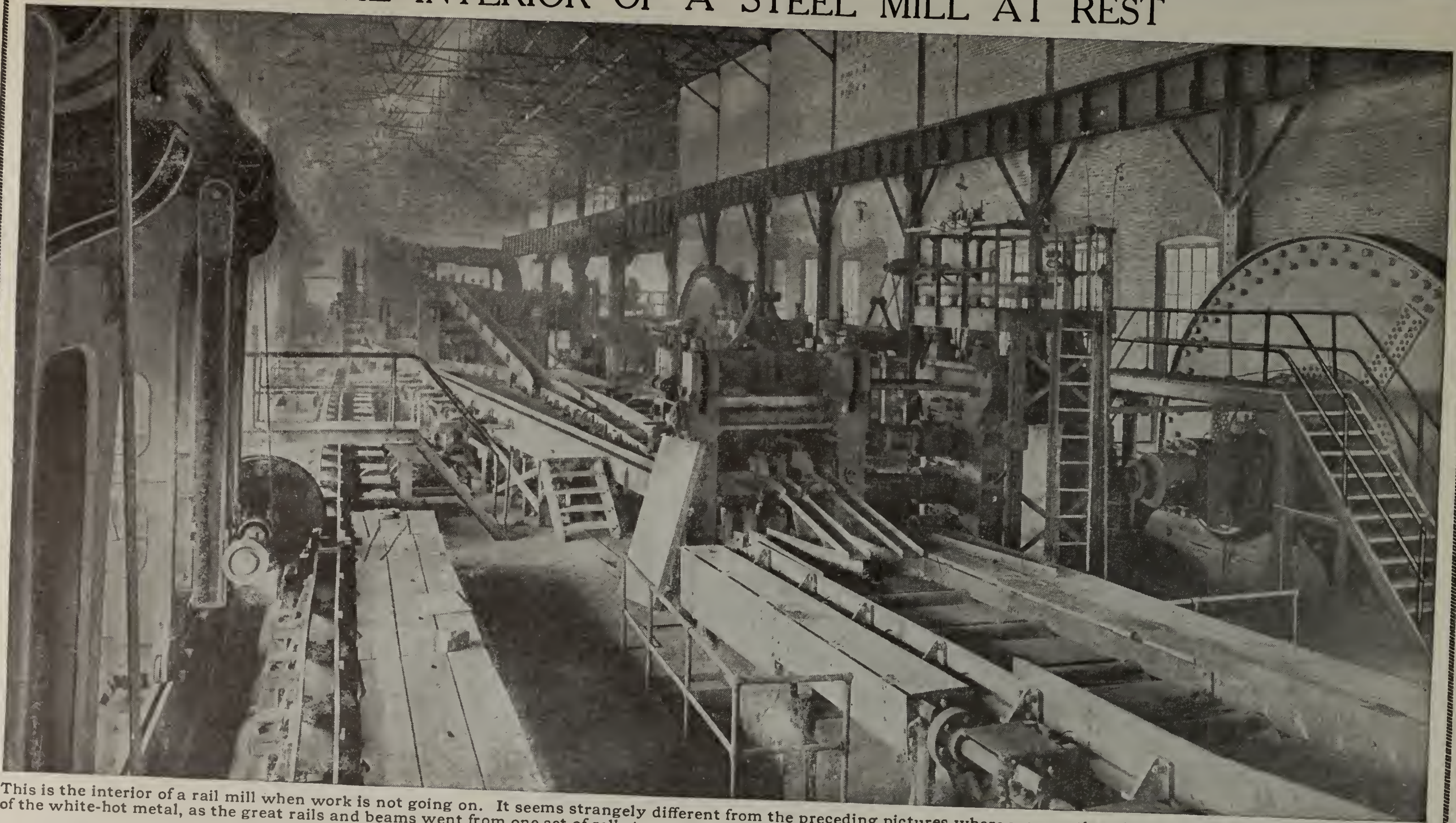
THE BEAM IS BECOMING A RAIL



Here we see a great room full of machines similar to that we saw on the preceding page. The process is continued and the rail is beginning to take its final form. The machine does most of the work, and only the guiding brains of a few men are necessary. It has been only a little while since the labour of many men could not do at all what you see here being done easily and quickly.

Picture by courtesy of the Illinois Steel Co.

THE INTERIOR OF A STEEL MILL AT REST

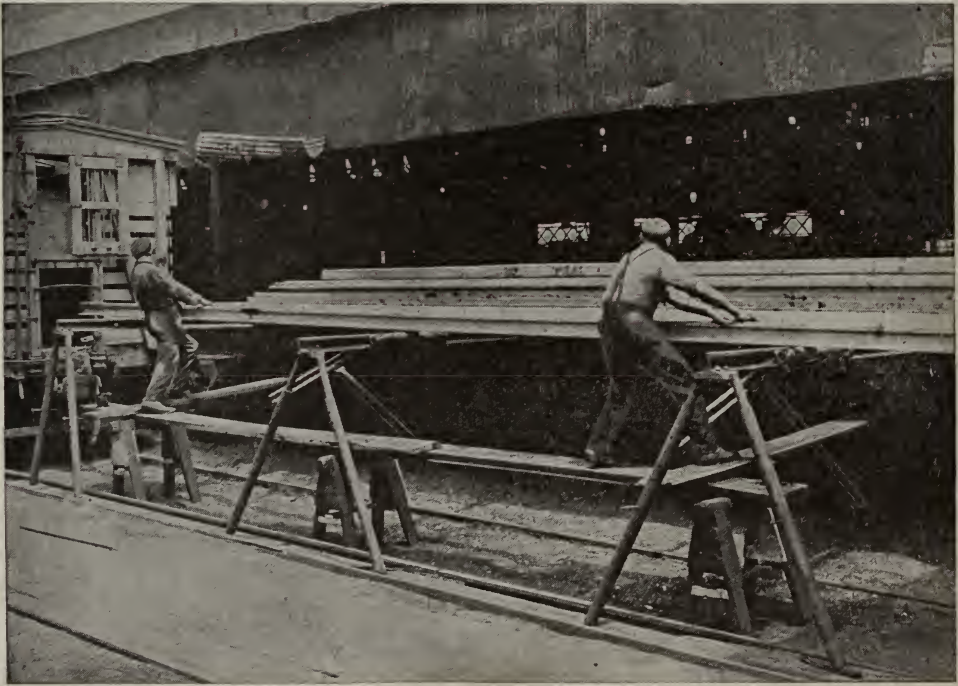


This is the interior of a rail mill when work is not going on. It seems strangely different from the preceding pictures where we saw the whole mill filled with the blinding light of the white-hot metal, as the great rails and beams went from one set of rolls to another, each of which left them a little more like the finished product.

Picture by courtesy of the Illinois Steel Co.

THE FINISHED PRODUCT

One of the interesting devices to save labour is the magnet which moves the heavy steel plates with so much ease. The magnet lifts the plate, and then carries it to a point immediately above the car. The current is then cut off and the plate drops. Without the magnet, handling the plates would be difficult and tedious.



Here we see men loading heavy steel rails into a car. It is interesting to wonder where these rails will finally be used. Perhaps it will be in our own country, perhaps in Canada, South America or even in China.

Pictures by courtesy of the Illinois Steel Co.

THE NEXT FAMILIAR THINGS BEGIN ON PAGE 5585

CONTINUED FROM PAGE 5467.

JAPANESE LABOURERS WORKING IN A RICE-FIELD

THE LAND OF THE RISING SUN

A HOLIDAY IN BEAUTIFUL JAPAN

ONE of the ways of seeing Japan is to take a ticket for around the world, and stop as long a possible at the middle "station." With a globe before us, and one forefinger on Great Britain, the other on Japan, we think it over. If we go westwards to the Far East, we must cross two great oceans, and a continent; if we take an easterly route, we can go by steamer all the way, through the Mediterranean, Suez Canel, and Indian Ocean, which will take us about seven weeks; or we can take the train from end to end of the great double continent, Eurasia, which lies between Britain and Japan, an amazing journey of about a fortnight from Paris to Moscow, and on to Vladivostock, and thence across the Sea of Japan in a few days more.

But this return ticket with which we can travel out and home again, without turning back, costs more than many of us spend in a lifetime of holidays, and even if we take the whole time for which it is available—two years—so much is there to see, and do, and learn everywhere, that we seem always in a perpetual rush, and always saying good-byes before we are ready to go. It is miserable saying good-bye—*Sayonara*—to Japan. So now for a second way in which to see the wonderful country, without tickets or sad good-byes. We start, if possible, though this does not really matter, in a swing or a hammock, in an orchard full of white and pink blossom; and as we gaze hard at the blue sky through the snowy glory tipped with golden sunshine, we pass—that is, the mind part of us passes—into the Land of the Rising Sun.

See how the long trail of islands which form to-day the Empire of Japan stretches off the eastern coast of Asia from Saghalien to Formosa. They are the highest parts of a huge mountain chain rising from a deep plain below the ocean. Toward the north it is nearly always winter, and here, chiefly in the island of Yezo, live the Brownies, as we may call them, of the fairyland of Japan.

These are the Ainos, descendants of an older and quite distinct race. They have been driven gradually northwards, and live apart from the Japanese in a poor way of their own, with many interesting customs. As they do not improve or learn much they are dying out as a race.

In the southernmost part of the island-empire—in beautiful Formosa—it is always summer. Here, too, the natives are quite distinct from the Japanese; it is not very long since they came under their rule. The main

THE MAIN STREET OF TOKIO

body of Japan consists of the islands opposite Korea, which is on the other side of the Sea of Japan. Here are the great cities and ports, grown of late years to be the wonder of the world; here are the mountains that hold so much treasure, though some of the tops pour forth flame and smoke and bitter destruction.

Here, too, down the rugged mountain-sides the short rivers come foaming white to the sea after the wet season. It is in this part of Japan, too, that we find the millions of tiny fields and farms, where great and valuable crops are carefully raised, in the valleys and in made terraces on the lower slopes of the mountains, all watered and manured as thoroughly as if they were gardens. The mountain-tops are reflected in many grand, still lakes, and the fleecy clouds scudding across the blue sky, the rustling willows, all look so life-like in these mirrors of Nature that we can hardly persuade ourselves that the mountains and clouds and trees are not really there below the water. Between three of the main islands, in the very heart of fairyland, lies the inland Sea of Japan. There is a feeling of infinite quiet and charm about this sea—often called the most beautiful in the world—that makes us long to sail on and on for ever in its soft air. Its clear blue water is lovely; the little islands, with trees and shrubs growing right to the water's edge, many with interesting shrines and temples, make a series of perfect pictures. But we are going to land, and begin a closer view of the country at Yokohama, the chief port of Japan on the side that faces America, across the wide Pacific. While still far out at sea we come in sight of the highest mountain in Japan, more than twice as high as our Mount Washington. As we gaze long at it, rising from the hidden and distant plain, so lonely and shadowy, so grandly simple in its form of an almost perfect cone, and crowned with pure white snow, we feel that we can understand a little the great love and reverence the Japanese have for it, and the delight their artists take in representing it on so much of their work.

It is Fujiyama, the Fire Goddess mountain. For all its peaceful appearance it is a slumbering volcano, formed of ashes and lava flung out of its crater. We long to climb it, for we hear that the path is a good one, and feel that it would be well to join the white-robed pilgrims, with bells jangling as they walk, who visit it with so much devotion, and rise before dawn to greet the sun as it mounts

WISTARIA GROWING IN A JAPANESE PARK

Both photographs copyrighted by H. C. White Co.

IN THE WONDERFUL FAIRYLAND OF JAPAN

Japan is the world's fairyland. With its beautiful scenery and its wonderful masses of dainty colour, it seems more like a splendid playground than a country which is taking a serious part in the real work of the modern world.

from the vast ocean, and colours the world afresh. It would be a new experience, too, to boil eggs in a hot spring.

But Yokohama comes first. The steam whistles and mass of shipping of many nations, the busy docks and creaking cranes, the warehouses and piles of goods, remind us that all the world comes to trade at Yokohama.

But how different do the coolies look, in their scanty blue clothes, from our dock labourers at home; what short policemen; how queer it seems to be whirled through the streets in a rickshaw, like a tiny hansom, with a man instead of a horse between the shafts!

A STREET IN TOKIO, WITH A LADY RIDING IN A RICKSHAW, THE PUBLIC CARRIAGE OF JAPAN

Our hotel is on much the same plan as those at home, and we see many Japanese in Western costume of coat and trousers. But still more are clothed in the national dress, the kimonos, which are like dressing-gowns, most of them in varied colours, men, women, and children all wearing much the same shaped garment.

Our plan is to go on to Tokio, about twenty miles distant by rail, for a long stay. It is the capital of the empire, an immense "city of beautiful distances," in the midst of which lives the mikado, or emperor. His spreading palace, with its heavy curved roofs and white walls, stands in a wonderfully laid-out garden-park, surrounded by a moat full of brown water, crossed here and there by arched bridges.

The houses are all built more or less on the same plan. There is in every case a roof, often curved, of thatch or tiles, held by posts. The walls are formed of sliding panels of strong oiled paper, which runs in grooves on floor and ceiling. Extra rooms are provided as required by sliding in extra panels. There are no doors or passages. Wooden shutters cover the outside paper walls, and at night are placed closely, each shutter keeping the next in place, the last being fastened with a bolt. One of the reasons for building houses in this simple and light way is that Japan is a country of earthquakes—it is said they have three hundred and sixty-five in a year—and if a house of paper and boards is shaken down it is less dangerous than if it were high and heavy, and it is easy to build it up again.

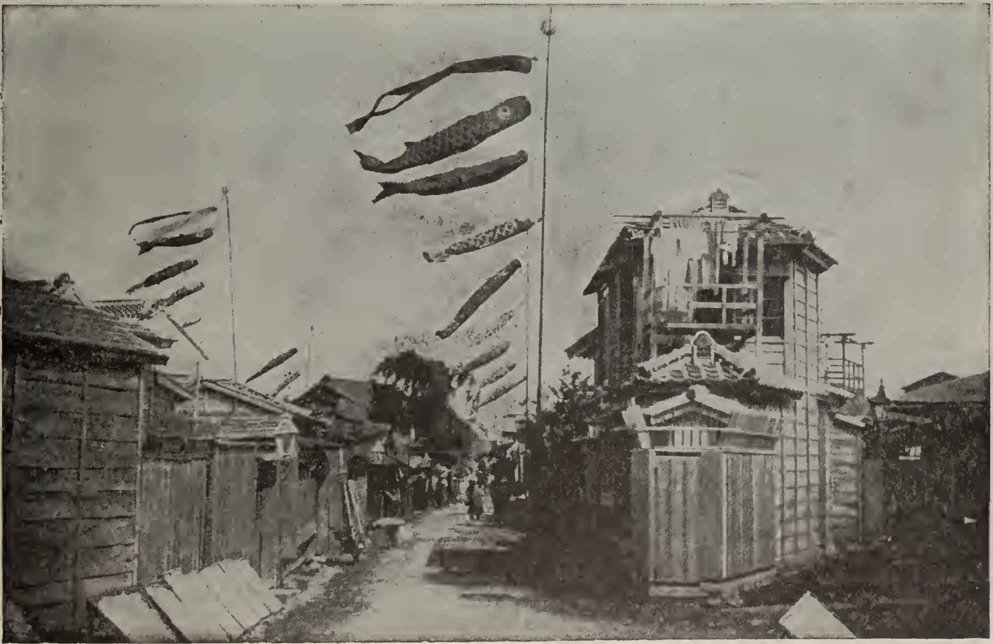
The fronts are open in the daytime, so we can see how simple is the furnishing of these homes. The floors are covered with beautiful soft straw mats, spotlessly clean, for boots and clogs worn out of doors are left outside, and the owners walk about indoors in their thick white *tabi*, or socks with a division for the big toe. In the daytime there are cushions to sit upon, no chairs, and at meals a low table is brought in for each person.

When hospitably asked to join in one of these meals, we find it very cramping to sit long on the floor, and very difficult to sip the numerous little cups of bitter tea without milk and sugar, as if we enjoyed them. There is no bread and butter, also very little meat is eaten in Japan, and the flavour of the dishes of fish and vegetables is very strange to Western taste. But the chief difficulty is how to get the food to our mouths with chopsticks instead of knife, fork, and spoon, especially as rice is one of the chief foods.

At night, thick cotton quilts, called *futons*, are laid on the floor, with a block of wood for a pillow, and those used to it sleep as comfortably between their *futons* as we do in our spring beds, with blankets and sheets and feather pillows. In the morning all the bedding and washing-bowls are cleared away into cupboards. There are no chimneys, for little charcoal portable stoves serve for cooking and warmth. This is the sort of accommodation we have when we go to Fujiyama, and upon other excursions.

FUJIYAMA, THE GREAT VOLCANO OF JAPAN

All this seems strange to us, but even more so does the custom of the Japanese in keeping most of the family treasures in a storehouse, or godown; and the pictures, which are seldom framed, screens, vases, and other ornaments are brought out, one or two at a time, to the living-house to be enjoyed and admired. We are never tired of looking at the bazaars and shops, only we want to buy everything, especially the dolls and toys, and the hundreds of pretty things made in Japan that we feel those at home will like for presents. We spend much time in the parks, for we know nothing like them in our own country. All is most carefully laid out to look like a landscape in miniature. As we linger over the lakes and streams, the little islands and bridges, and quaint summer-houses, noting the trees planted in just the right position, and of just the



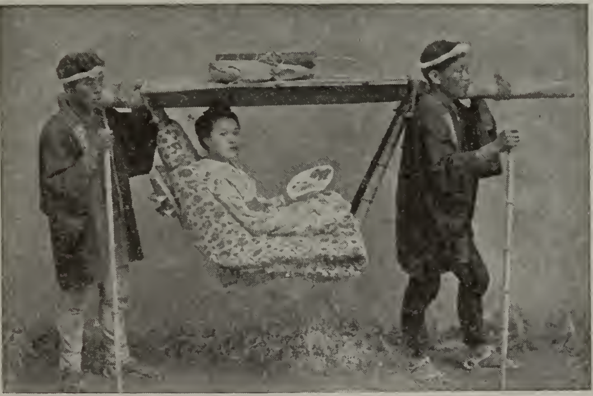
A STREET IN YOKOHAMA DECORATED FOR THE GREAT ANNUAL BOYS' FESTIVAL right sizes to fit in with the whole scheme, we feel as if we were walking in the scenery of a willow-pattern plate. But charming as is everything else, nothing delights us so much as the flowers of Japan. There flowers grow so well, and are so carefully tended, that there is a perfect feast of colour over the land nearly everywhere, and nearly all the year. The gay procession begins with the fruit-tree blossom in early spring, so much appreciated that there is a special holiday for everyone to go out and see it at its best in the great parks.

As the months pass on, there follow the magnificent purple and white wistarias, hanging from heights and trellises like curtains, the grand irises and lilies, great fields of them, the creamy lotuses, and crimson peonies and azaleas, and countless others, ending up in the late autumn with every kind of chrysanthemum—a perfect blaze of glory, which is set off by the red and gold of the autumn leaves. Truly a "jocund" company! And the flowers lead us on to the children, for they are as gay and joyous as the flowers themselves, especially on the great holidays. Then they put on their brightest kimonos—blue, pink, gold, scarlet, with sprays of wistaria, cherry blossom, roses, printed or woven, or embroidered across them, and around the waist a fine broad *obi*, or sash, of as beautiful material as the parents can afford, tied in large butterfly bows at the back. As the glossy black hair of the little girls is neatly arranged in grown-up fashion with fine combs and pins, they look like little copies of their mothers. These little *mousmes* seem always merry and pretty and active. The boys also wear kimonos, but not quite so fine as those that the girls wear. As soon as they are seven they are proud to wear little trousers underneath, instead of crimson petticoats, like their sisters. As for the babies—if we have a chance of making friends with a Japanese baby, we do not know how to give it up. They are just like the Japanese dolls we know and love. The little head is partly

THE INSIDE OF A JAPANESE HOUSE
Copyright by H. C. White Co.

A CLASS OF JAPANESE GIRLS IN SCHOOL AT TOKIO

shaved, and cuddles into your neck just as the dolls do. The soft little hands and feet have fat folds round them, and the little kimono is tied with a narrow sash. While the baby is quite small, it is carefully tied in a shawl to its mother or sister's back, and sleeps peacefully there, or watches with its serious black eyes, quite contentedly, the sweeping and cooking, or the games that are being played.


HOW LADIES TRAVEL IN THE COUNTRY PARTS OF JAPAN

For Japanese children, and quite old grown-ups, too, are grand at games. We look on with amazement at a kite contest. A great dragon and a bird are flying high in the air—can you feel how strongly they tug at the string? Another great interest is having wonderful competitions in top-spinning. Battledore and shuttlecock, and ball games, are all favourites. The best, or honourable, dolls, as they are called, with their clothes and furniture, are kept in the godown with other family treasures, often handed down from grandmothers' grandmothers, and are brought out when the girls keep high festival on the third of March. The boys have their great festival on the fifth of May.

JAPANESE GIRLS PLAYING SHUTTLECOCK

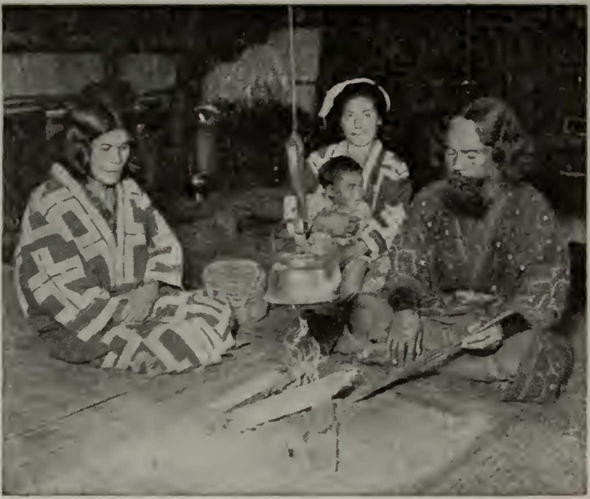
It is said that Japanese children are never naughty, never cry; if that is true, it shows what good parents they have. At any rate, it is one of the greatest pleasures to watch their politeness; even the babies are trained in gentle manners and obedience, and they seem always happy and content. Their parents are devoted to them, though it would not occur to them to kiss and pet them—that is not the custom of the country. They bring them up as well as they can, and keep them very clean, for hot baths—very hot baths—are universal in Japan for everybody, even the poorest. They also buy the children toys according to their means, and give them treats of every kind, especially at the fairs and festivals, which make up a large part of the busy Japanese life, that has no weekly Sundays. But Japanese children work hard as well as play thoroughly. It takes years to learn to read the difficult Chinese characters which they borrowed from their neighbours hundreds of years ago. A Japanese kindergarten is a delightful sight, so is a class at work with a rabbit or bird before them, reproducing it in modelling or painting from Nature, using both hands equally well. We are surprised at the beautiful results, till we remember that they belong to a nation of artists, the best handicraftsmen in the world. The schools of Japan are full to overflowing, and are of every kind to meet the needs of the different classes of learners. The boys are carefully trained in gymnastics, which so develop their strength that when they grow up they can tackle strong men of other nations much larger than themselves.

As we go round the schools, it seems strange to us to see the readers turning over the leaves backwards, for a Japanese book begins where ours ends. A very favourite subject is the country's history. The memory of those who are dead and gone is held in the greatest respect; ancestors are never forgotten. Children enjoy going to the plays in which the stirring deeds of old heroes are acted at length, and visiting the temples and tombs of the mighty dead, which are among the great sights of Japan.

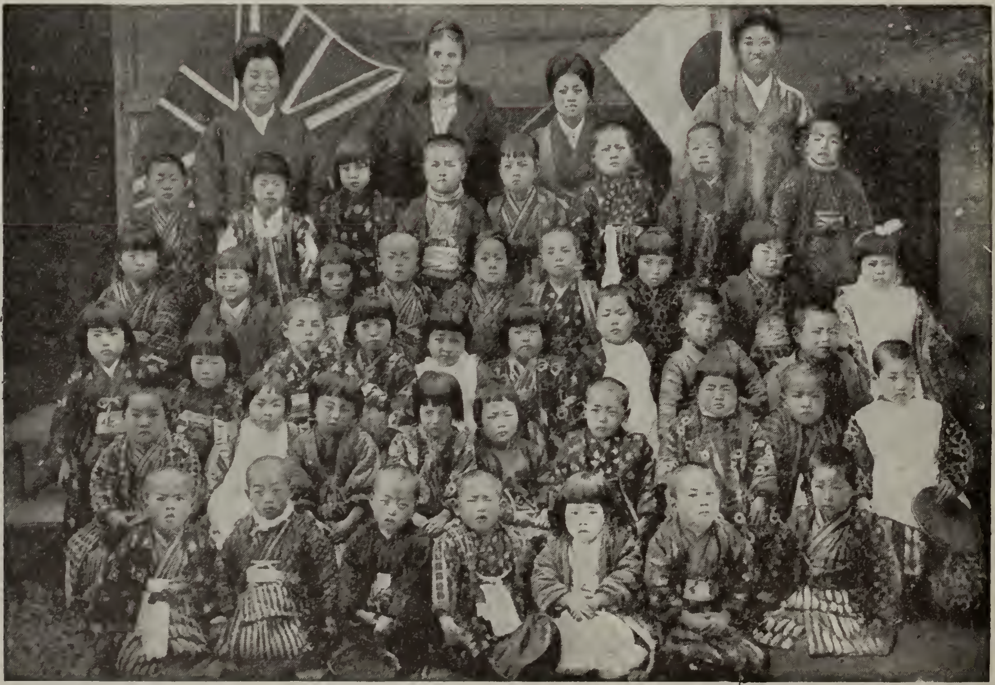
But the little mousmés grow up very quickly, and marry early, and then their turn comes to wear sober greys and browns, to stay quietly at home and wait on their husband and his relations, and bring up the next generation of joyous, good children.

And the boys, so clever with kites and tops, soon have to follow their fathers, according to their station in life, in doing all the manifold kinds of work needed in the empire. Perhaps it is careful farming and gardening, or fishing, or something connected with the various handicrafts, the lacquer work, bronze, china, baskets, toys, for which the country is famous. Since the days, only sixty years ago, when Japan opened her gates to the world beyond, many go to work in mills and factories, and at trades connected with all the modern inventions so quickly adopted by New Japan. All, too, must take their turn in serving their country in the wonderful new army and navy, which have already astonished the world in two great wars. And thev have to learn to use a vote.

Japan has done great things, but the hardest time is yet to come, for the great mass of the people are just beginning to adopt Western ideas, and yet the old ones die hard.



A FAMILY OF AINOS IN THEIR HOME
The Ainos are the earliest known inhabitants of Japan
Copyright by H. C. White Co.



JAPANESE CHILDREN OF A KINDERGARTEN SCHOOL IN TOKIO DRESSED IN NATIONAL COSTUME
The photographs in these pages are by Underwood & Underwood and the H. C. White Company

ON THE ROAD TO THE CITY OF TEMPLES

Copyright by H. C. White Co.

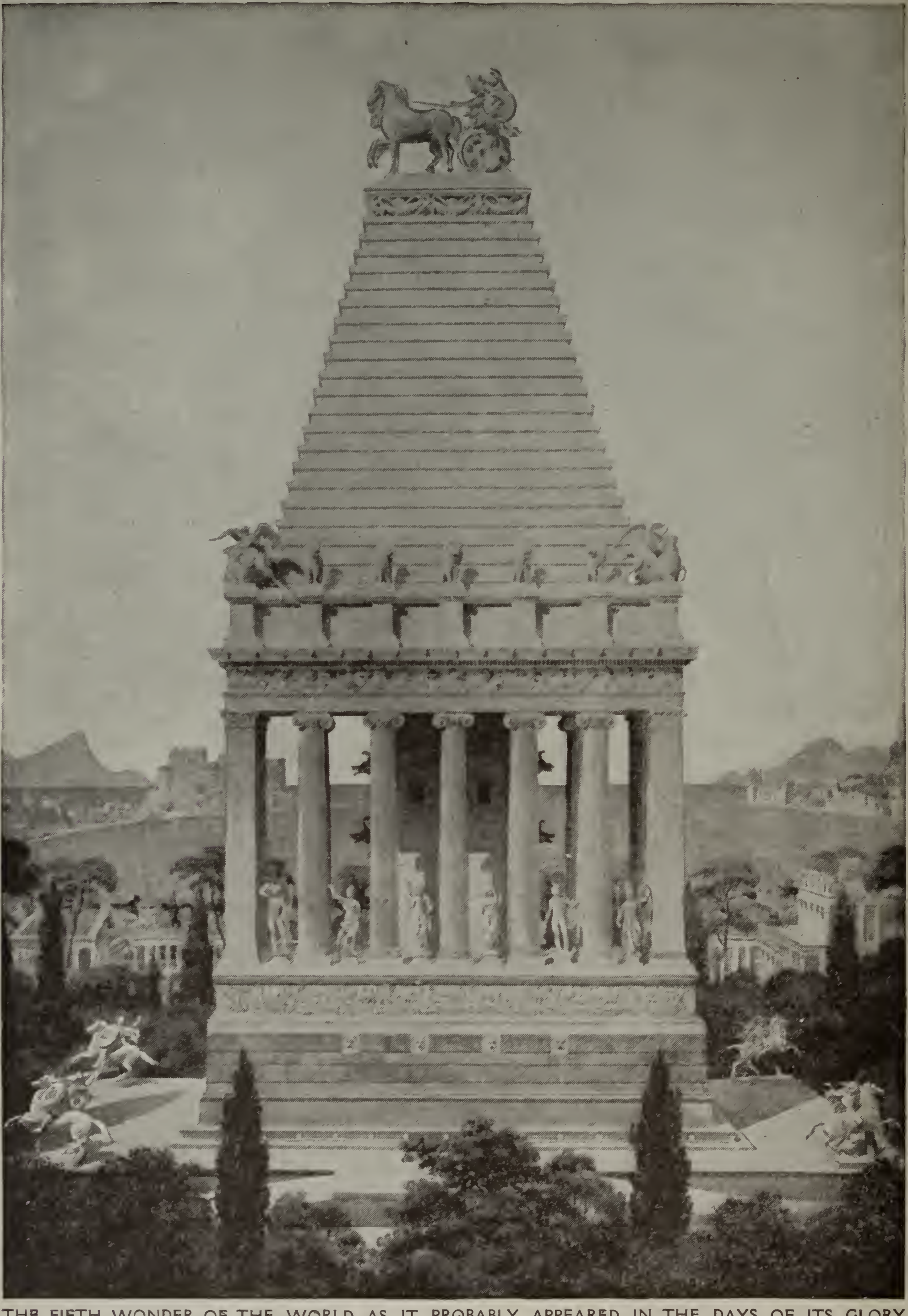
Here we see a long avenue of beautiful Japanese cryptomeria trees leading to the temples at Nikko. Nikko is one of the sacred cities of Japan and is full of terraced temples, filled with a multitude of queer little statues of gods. Some of the cryptomeria trees in this avenue are fully fifty or sixty feet high.

SCENE ON THE SEA OF JAPAN

We shall see on our trip not only what we have already seen at a number of our museums—but the clever workers themselves. Naturally, they will find things Western as new and strange to their eyes as things Japanese have seemed to us. Our large green meadows and tall hedges will look unusual to them, for there is little grass in Japan, and no hedges divide the small, highly-cultivated fields. The grimy rivers will be a surprise when the visitors think of the gay scenes at home, on rivers and lakes near great cities on summer evenings. The number of horses will seem unusual, for there are but few, and those small, in Japan. It will puzzle them at first to see planing and sawing done in the opposite direction to their own way, and screws and keys also acting on the rule of contrary. And what will they think of our high houses?

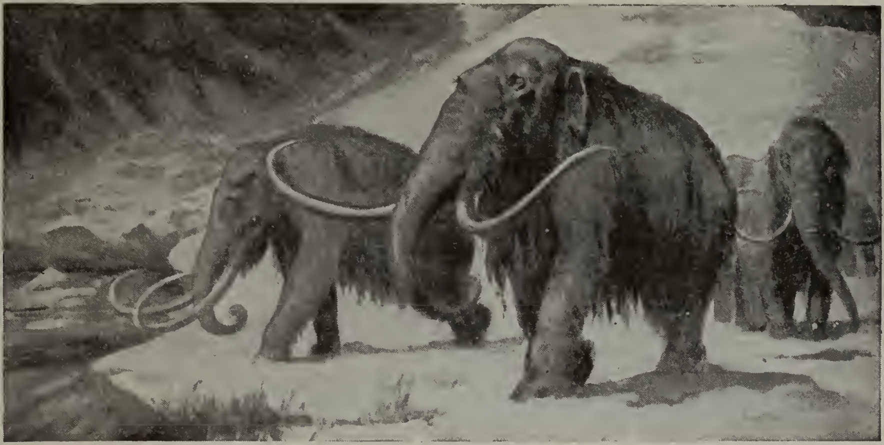
THE NEXT STORY OF COUNTRIES IS ON PAGE 5669.

THE WONDERFUL TOMB OF KING MAUSOLUS



THE FIFTH WONDER OF THE WORLD AS IT PROBABLY APPEARED IN THE DAYS OF ITS GLORY

When Mausolus, the King, or Prince, of Caria, died, his widow, Artemisia, decided to erect over his remains the most magnificent tomb that the world had ever seen or should ever see. She employed some of the most famous sculptors of ancient times, and although Artemisia herself died before the tomb was finished, the sculptors completed it because they loved their work, and regarded this monument as the most glorious triumph of art that the world had seen. It is from this Tomb that there arose the word "Mausoleum," which means a stately tomb.



UNKNOWN ANIMALS

UNDER the lens of a powerful microscope a drop of water is seen to be teeming with living things. To the tiny creatures in it that drop of water is as an ocean, and to these living specks the larger forms of life in the water must seem as huge and terrible as hungry sharks in the sea are to human beings. That little drop of water looks to the eye as clear and free from life as if it had been distilled from dew upon the petal of some fair rose. That there is in it life of any sort surprises us; that there are so many living creatures there of varying forms and sizes is almost impossible to believe until the microscope enables us actually to see them. If that bead of water holds such mysteries, what of the world in which it has so small a part?

Let us step for a moment into the garden, and ask ourselves if that has any secrets hidden from us. There lie the lawns and flower-beds and kitchen-garden, looking solitary enough. Besides the birds there is not a living thing to be seen. We walk about the garden, and wish our parents had made us zoo keepers—a glorious life!—so that we might always have had beasts and birds and reptiles about us, instead of this tame garden with nothing in it but flowers, and fruit, and vegetables, and trees, and creepers, and shrubs. Cabbages do not satisfy the soul when we sigh for crocodiles; lettuces are a poor substitute for lions; nobody would be content with a geranium when he is panting for a giraffe, or express thanks for a tomato when he yearns for a tiger.

In this discontented frame of mind we wander up to the conservatory, and sniff bad-temperedly at the flowers there. Suddenly a little voice beside us says: "Look, here are some frogs in the tank!" Yes, there they are, merry little things, some of the four hundred frogs which we reared from the early tadpole stage in the previous year, and, to the great horror of somebody, turned loose in the garden.

There is joy in this evidence of life, and it sets us thinking. After all, is this garden such a solitude? Are there not moles, and mice, and voles in any number beneath its surface? Are there not more frogs in the long, damp grass of the orchard; newts in the moist borders surrounding the glass-houses, and possibly a toad or two down in the stokehole of the furnace which warms the houses? Why is the gardener so carefully washing the leaves of the young celery plants? It is because the leaves are smothered with the eggs of the celery fly. The cabbages are studded with the eggs of butterflies; the ants are busy shepherding aphides on the rose-trees. Why are the young

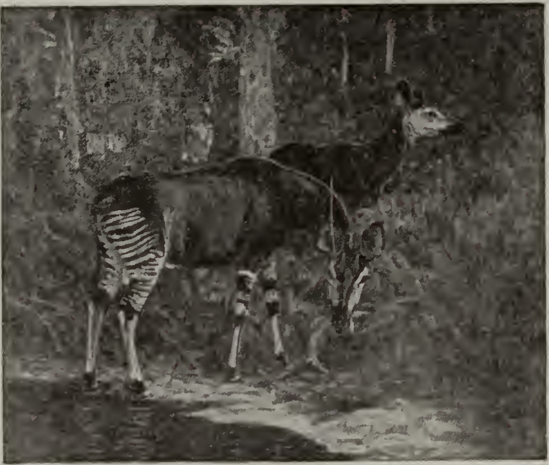
CONTINUED FROM PAGE 5482

peas and strawberry plants so carefully netted off? To keep the mice away. Things look more lively now, and we are less ill-tempered. A great horny beetle, with a host of little ones clinging to it, scuttles across a sunny walk, and we remember that that beetle is one of a multitude of kinds which make their home in the garden. Down in the soil, we remember, there are myriads of insects and lesser creatures. Here is a garden of three acres or less. Well, in it there are quite half a million fine fat worms, all steadily at work making the soil better. And then there are myriads and myriads of microbes in the soil, all at work for their own benefit and ours; there may be as many as 400,000 to a single cubic inch of soil. Things are decidedly looking brighter. We can leave the zoo to its keepers without further regret; we have got our own little zoo at home, all round us.

That is the sort of experience that any one of us can have. We go growling into the garden as into a place of solitude, quite lacking life, and find that, though we cannot see them, there are more living things in that garden than there are people in all the world. Now, the great zoologists feel at times as we feel. They say sadly to themselves, not that the world is without animals, but that it contains no more new animals, no animals with which they are not all familiar.

They know that they have not been able to fathom the sea, nor to classify all the insects and tiny forms of life, for that no man will ever be able to do. There are more insects, both kinds and individuals, than most of us dream. That this is so we can try for ourselves. Let us ask any of our friends which, in their opinion, would weigh the heavier—the backboned things of the world, or the things without backbones? Ask them to imagine a gigantic pair of scales. In one side let them fancy that they put all the animals—men, elephants, rhinoceroses, hippopotamuses, lions, tigers, all the fierce animals, all the mild-tempered animals; the whales and seals and manatees, the sharks and all the big fish and little fish, and all the birds and reptiles and amphibians—put all those into one scale. In the other, put the insects of the world. Which, let us ask our friends, will weigh the heavier? Our friends will say that the scale containing the backboned animals will easily weigh the heavier. But in the judgment of great authorities that is wrong; the little things are so many in kind and number that they will outweigh all the rest of the life of the world put together.

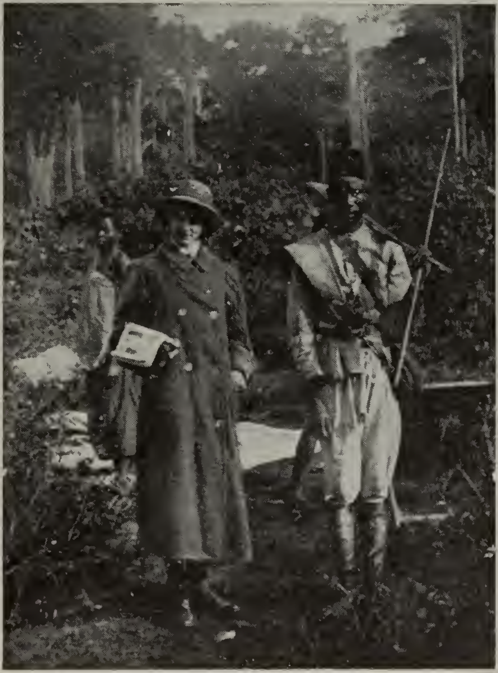
In this vast assemblage there are very many still to be discovered and known. But with the big things it is different. It is as to these that the zoologist grows sad. He has no more secrets to gain, he sometimes thinks. Then some splendid fact bobs up and kills his theory. He is not as wise as he thinks. There are more living things beneath the skies than he knows of. There cannot be very many more living things to be discovered, but not all the list of surprises is exhausted. It took years and years to find the little mosquito which carries disease and death to our countrymen who go out to tropical climates. The mosquito was there in abundance, but the brave men who were devoting their lives to the pursuit of it could not know that the mosquito was at work when they slept, and that when the men were awake the evil insect retired to rest. That is a little instance of the way in which members of the great animal kingdom succeed, age after age, in escaping the notice of man.


THE OKAPI, WHICH WAS DISCOVERED IN 1899
Specially drawn by Sir Harry Johnston

Think of it—for thousands and thousands of years Africa has had a beautiful animal called the okapi, yet up to the present moment only one white man, or two at the most, has ever seen one of these animals. Until a few years back any great zoologist would have told us that he knew of all the animals in the Dark Continent; yet here, awaiting discovery, was one of the most interesting creatures in the land — the connecting link between the giraffes and the gazelles. White men have gone specially to Africa to seek the okapi in the forest where it is known to live, but they have never seen one alive.

The manner of our learning of such an animal was in itself a little romance. Fairy books and travellers' tales have often told us of tiny pigmy men and women, but nobody believed that such people existed. Dwarfs there have been in plenty, but no one believed that there really existed tribes of people whose chief distinction it is to be small.

But such men and women have been discovered in the heart of Africa, and Major Powell Cotton, when he got married, took his young bride to stay with the pigmies; and the brave girl-wife dwelt in the midst of the tiny savages while her husband went off into the forest, hunting strange animals. She can never forget the wonder of these people when they caught sight of her brushing her hair. These little people were the only ones to know of this strange animal in whose existence scientists did not believe. *They* knew all about its habits. They knew that it eats only one particular sort of food which grows nowhere but in these forests. They knew how shy and silent and solitary it is; how the scent of a man far away from it will make it desert its feeding-grounds and fly for safety deep into the dense undergrowth, where not even the pigmies can follow. But the little men knew that there are moments when they can steal up to it, and inflict a deadly injury with the poisoned arrows which they use. These were the little people who instructed our wise and daring scientist-hunters that the wise men of England have not yet learned all the secrets of Nature.



MRS. POWELL COTTON
Who lived alone with the pigmies in the heart of Africa

It is worth remembering, too, that this same traveller of whom we have been thinking stayed some time with cave men and women in Africa. He found men and women and children living in tribes of three or four or five families, clad in skins, and making their homes in rough caves, living exactly as our forefathers lived in savage old Europe, when the mammoth and the hyena and the cave bear were there to share the land with them. These facts help us to realise that not every vestige of the old, old world has yet passed; that there are things still for us to see and know — animals in the wilds of which we had not heard; tiny men and women in the forest like the pigmies of the story-books; men and women in caves like the ancient Britons; men and women and children and domestic animals amid the eternal ice and snow, living just the lives which men and women lived in the Ice Age.

Facts like these make the thoughtful student wonder whether there are not in the world still more relics of the past which, hiding in the wild, untrodden ways of mysterious lands, have not yet been seen by hunter or traveller. They cannot but wonder if the so-called extinct monsters really all died out, or whether there may not still be some survivors. Scorpions exist to-day in much the same form that they have had since scorpions were first created.

The duckbill, that wonderful animal with furry body, bird's bill, and paddle-like feet, with which it can swim in the water and burrow on dry land, lives to-day in Australia, unchanged from the form in which its ancestors, which were among the first of all animals, originally appeared. It took years and years to make men believe the stories which the natives of Australia told of this remarkable egg-laying animal; and when at last a white man found the duckbill, and learned the whole story of its life, he cabled home the news, and had it sent from England on to Canada with as much excitement as if a new continent had been discovered.

Then we have the tuatera, a lizard living in the islands off the north-east of New Zealand, which has remained unchanged through ages since it first took its present form. Other lizards have changed enormously, but not the tuatera. There is a greater difference between the tuatera and the ordinary lizard than there is between the ordinary lizard and the serpent. The tuatera is the one creature on earth which still has three eyes. On the top of its head, under a fold of skin, making it useless, there lies that third eye which all animals are said to have had at one time. In the young this can be clearly seen through the skin.

THE GIANT SLOTH

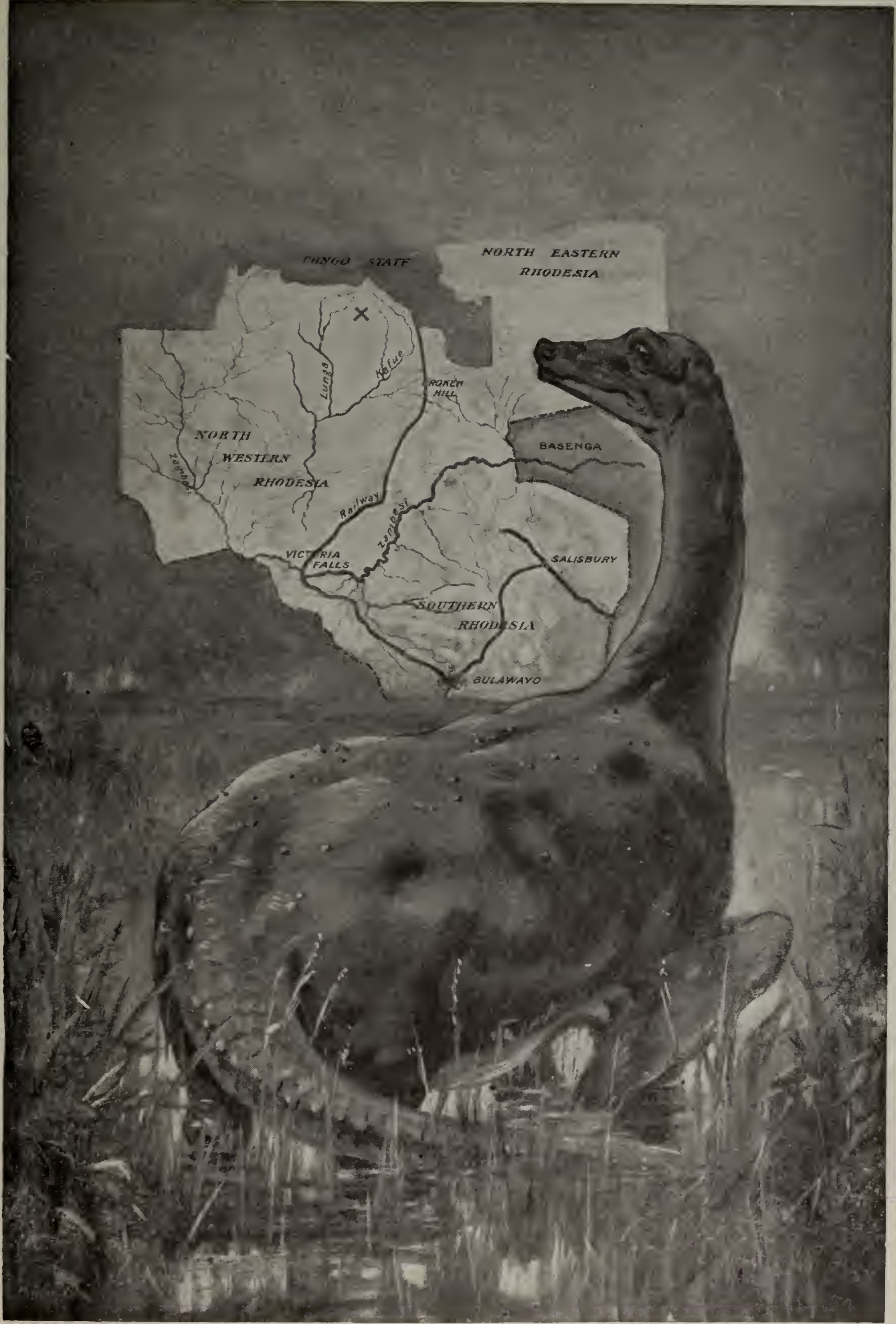
A few years ago a band of British hunters went to search for this monster in Patagonia, but were unable to find it.

Now, inquiring naturalists say to themselves: "If these two creatures, together with the echidna, or spiny ant-eater, another practically unchanged animal, can have lived unaltered through all these millions of years, are there not some other animals still alive surviving from the old days?" And, believing that there is something in the theory, they go, or send men, into the wilds to prove the truth of the question. One of the most exciting chases was one undertaken a few years ago to find the giant sloth of Patagonia. It had a body as big as an elephant's, and when it sat up on its mighty hind legs to pull down a tree-top to eat, it was fourteen feet high. These giant sloths were the animal lords of South America at the time when the mastodon and mammoth lorded it over North America. We cannot tell why they died out. One belief is that the enormous number of guanacoes, camel-like creatures which abounded in America, by constantly biting off the young shoots of trees, killed all the forests in which the sloth lived. Goats killed the trees of all the hills of Greece and the plains of the Mediterranean countries, making all barren. Guanacoes may have done the same for that part of South America in which the sloths lived. That, however, would not explain the disappearance of the horse. There were once myriads of horse-like animals in South America, but when the first white man landed there, there was not a horse in the whole continent. These are mysteries for which we cannot account.

Anyhow, naturalists sent out an expedition, fully believing that somewhere in the remote parts of South America the giant sloth still exists. The expedition was not successful; but we now know that the great monsters lived in caves with men, and that men and women and children made pets of them; for after all these ages we find the very grass which the men cut for the sloths turned into withered hay, in the caverns.

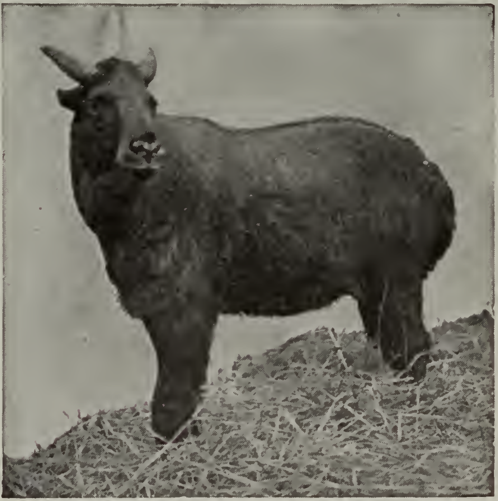
We got all our news about new animals from natives, therefore we are bound to pay attention to stories which come again and again to us from natives occupying quite different parts of the same country. The natives' tales of pigmies and cave men, of the okapi and of the duckbill,

A GIANT LIZARD THAT MAY BE LIVING TO-DAY



The African natives are very emphatic in their stories of a fearful creature, half elephant and half dragon, that inhabits the huge swamps of Northern Rhodesia, and Mr. Carl Hagenbeck, the great European importer of wild animals, believes that some creature like the prehistoric brontosaurus really lives in these dismal and lonely swamps. This picture shows what the brontosaurus was like, and the cross on the map marks the place where it is supposed to live. See page 18. The word brontosaurus comes from two words that mean thundering reptile.

were long disbelieved; but, as we have seen, they were true. This fact weighs with the men who believe that there may be truth in the marvellous stories which are told of a fearful monster living to-day in the swampy heart of a great part of Africa, called Rhodesia. The story was first heard from natives in Africa a good many years ago by a trustworthy traveller named Menges. It came up again a few years ago when Mr. Carl Hagenbeck, the greatest importer of wild animals in the world, received two different reports to the same effect. One of his own hunters, who had been in Rhodesia in search of animals, heard of it; and an English traveller, who had entered and left Rhodesia by a different route from that taken by Mr. Hagenbeck's representative, also heard of it. The natives describe it as a huge monster, "half elephant, and half dragon," dwelling in the great swamps in the interior, which are hundreds of square miles in extent. There are drawings of such an animal in certain caves in Rhodesia; which suggests that the natives either have wonderful imaginations, or have actually seen such a creature. We know that in olden times they made drawings on stone and ivory, and on the walls of their caves, of reindeer, bears, mammoths, and other animals then living, and we find skeletons of the animals they drew, mingled with the remains of the men who scratched the pictures on the walls and on ivory.



THE TAKIN, NOW IN THE LONDON ZOO

A creature from Tibet, was unknown until recently

This photograph is by W. P. Dando, F.Z.S.

Mr. Hagenbeck firmly believes that such an animal as this monster does exist to-day in the great and silent swamps of Rhodesia, and he sent an expedition to hunt for it. The hunt failed, for the men were laid low by terrible fevers, and attacked by bloodthirsty savages. Although he failed on this occasion Mr. Hagenbeck, in a book that he has written, called "Beasts and Men," says that he hopes yet to prove that this animal does exist. He thinks it must be like the extinct brontosaurus. This was an animal 65 feet long, and weighing over 35 tons. It fed on the vegetation of swamps, and lived half in the water and half on land; which, of course, is just the sort of life that would be led by this monster of which the Rhodesian natives tell to-day.

There are those who hope that some day we shall find that the quagga, that relation of the zebra which is supposed to have become extinct quite recently, is not dead; that somewhere or other two or three lurk secure and unsuspected by the deadly hunters. Men still go wearily seeking the moa, the giant bird of New Zealand, fully believing that the natives are right when they say that here and there, in the heart of the New Zealand mountains, these feathered giants still live. The same hope animates those who believe that somewhere in the less frequented islands of the Indian Ocean a dodo or two may linger in safety. Perhaps the most romantic faith of all is that of the men who hold that the mammoth still exists in the North. Indian hunters from time to time bring back reports that far up in Alaska, almost at the coast of the Arctic Ocean, a solitary herd of mammoths still lives and flourishes. New things do come to light. It was only the other month that Europe saw for the first time a takin, an animal which comes between the goats and the antelopes. The animal is too big, one would have thought, to have escaped attention. It is 3½ feet high at the shoulder, and has great horns, with which it can kill a man; but because its home is mysterious Tibet, a land into which it has been dangerous for Europeans to go, it has been regarded as having no existence.

THE NEXT STORY OF NATURE IS ON PAGE 5621.

WHY DO WE WORRY?

CONTINUED FROM PAGE 5486.

WORRY is a state of feeling, and, as everyone knows, it may be aroused by many causes, real or imaginary. Yet this is a question well worth answering, because it helps to teach us a great fact about ourselves. If we think about worry and observe ourselves, we shall notice that we do not worry about the present. We worry about having to go to the dentist, but when the tooth is actually being drilled we do not worry, though we may fear. Worry is perhaps fear, but it is always about either the future or the past, usually the future.

A creature, then, that lives entirely in the present cannot worry; but all creatures except ourselves live in the present, and babies and very small children live in the present, too, so they cannot worry. The great and grand mark of man, however, is that, as Shakespeare said, he is "made with such large discourse, looking before and after." It is this power of "looking before and after" that makes worry possible; and, therefore, just as worry cannot happen in cabbages or animals, or even in infants or two-year-olds, so it is *most* liable to happen in the highest types of human being, who have most imagination and live least in the present, and most in the future and in the past.

This power of mankind by which we are aware of ourselves, and can figure ourselves in the past and in the future, is called self-consciousness, and is, above all things, that which distinguishes us from all other creatures in the world. And worry, as we have seen, is one of its consequences.

WHAT IS A THERMOS FLASK?

A thermos is a flask that keeps a hot liquid hot for a very long time. Thermos is simply the Greek word for heat; but it is really not a particularly good name, because, though it keeps a hot liquid hot for a long time, it also keeps a cold liquid cold. That fact really gives us the key to what happens, if we have right ideas as to what heat is. Heat is something, and cold is only the absence of heat. Therefore, when this little instrument keeps a hot thing hot, it must, somehow or other, be keeping the heat in, and when it keeps a cold thing cold, it must somehow be keeping heat out.

Now, we know perfectly well that a flannel blanket, for instance, acts in just the same way. It will keep a hot thing hot because it keeps its heat in, and it will prevent ice from melting because it keeps heat out. It does these things because it is a bad conductor of heat.

A thermos flask, then, must somehow be a bad conductor of heat. Between the outer and inner walls there is a space which is full, as far as possible, with simply nothing. If there were air there, in the usual quantity, it would readily conduct the heat from inner wall to outer wall, or in the opposite direction, but the flask is so made that there shall be as little air in this space as possible, and so there is very little to carry heat across. A blanket is more like a great gate set up through which the heat cannot get in or out, but the thermos flask is more like a moat or ditch over which the heat cannot jump in or out.

DOES WHISKY MAKE PEOPLE WARMER?

This is one of the most interesting cases, of which the world is full, where the true answer to a question is just the opposite of what people think it to be. In every part of the civilised world men are still to be found who tell us that they drink whisky to keep out the cold, and this seems to be a specially sensible thing to do when one is going out into the cold night air from a warm room. People judge in such a case by what they feel, and indeed there was no other way of judging fifty or sixty years ago. It is certain that whisky makes a man feel warmer, and if he *feels* warmer he naturally thinks and says that he *is* warmer.

Yet, in fact, he is cooler. This can be shown nowadays by means of the little thermometers which doctors first began to use thirty or forty years ago, and which tell not the temperature of the skin, which matters nothing, but the temperature of the blood, which matters everything. The thermometer shows that after drinking whisky a man's blood gets colder, and so the man's body, as a whole, is colder, though for a time his skin feels warmer, and indeed is somewhat warmer.

WHAT HAPPENS WHEN A MAN DRINKS WHISKY?

When a man drinks whisky, the whisky causes a large quantity of blood to pass quickly through the blood-vessels of the skin. This means that the skin is made warmer, and as the nerves of heat end in the skin, we are deceived and say that we are warmer. But really we are cooler, because the warm blood, exposed in large quantities at the surface of the body, rapidly loses a quantity of its heat to the outside world. This is only one of many instances where we are deceived by the surface of a thing, and the thing in this special case is our own body.

WHY DOES MILK TURN SOUR?

The change that takes place in milk when it turns sour is entirely due to the growth of microbes in it. If the milk is boiled, and then sealed up in something, it will not turn sour in any weather nor in any length of time, because all the microbes in the milk, including those that turn it sour, have been killed by the boiling. Much warmth and electricity in the air to which milk is exposed favour the growth of the microbes in the milk. Microbes are plants, and we know that warmth and electricity in the air favour the growth of other plants, such as wheat or potatoes.

The stuff in sour milk which gives it its sour taste is an acid, of course, and it has the special name, which everyone should certainly know, of *lactic* acid, which simply means milk acid. It is made by microbes from the sugar in the milk, which has the corresponding name of *lacoste*. Lactic acid is not bad for us, but good for us; and if good, clean milk turns sour it is none the worse for that, but in some ways, and for some people, it is much better than is milk as we usually drink it. Milk that has turned sour is highly recommended by many doctors for curing certain diseases.

WHY CAN BABY ANIMALS WALK SO MUCH SOONER THAN HUMAN BABIES?

A great book might be written about this wonderful question. One of the answers to it is that there is to some extent a proportion between a creature's length of life and the length of time it takes to grow up. We should expect the growing-up process to be quicker in the case of an animal that is very old at fifteen than in the case of a creature that may live to be a hundred or more years.

But this fact does not nearly account for the extraordinary difference in the rate of development of babies as compared with the lower animals. There must be some other principle at work. Part of the explanation is that in the highest types of animals we find that the young creatures are much more dependent upon their mothers, and for a much longer time, than are the lower animals. This is true if we compare birds with reptiles, or horses or dogs with fishes, or even with rats and rabbits. It is far more true when we compare ourselves with the lower animals.

Now, at first it seems surprising that the highest kinds of creature should be less capable when they are born than lower kinds. But if we compare man with, say, a dog, we shall see the reason. A dog, because it is much higher than a rabbit or a fish, can learn a little; but most of what it does it does by instinct, and instinct requires no teaching. A man has instincts too, but the great mark of him is that he is intelligent; and though intelligence can learn everything, it has everything to learn. The baby is born knowing nothing, but with endless powers of learning, and that is why it takes so long to do things.

WHY DOES A BIRD FORSAKE ITS NEST IF ITS EGGS ARE TOUCHED?

The whole meaning and purpose of the bird's nest is to be found in the eggs. The eggs exist for the future of the bird race, and the nest exists for the sake of the eggs. If the eggs are stolen, then the instinct which made the bird build the nest is disappointed, and we cannot be surprised that the bird deserts her nest.

But sometimes it may be that, even though some or all of the eggs are left, the bird may forsake her nest if it has been touched. In such cases we can only guess what really happens.

It may quite possibly be that, when the eggs have been handled, the bird is aware of a strange scent in the nest, and this "puts her off," as we say. She feels that something is wrong, and she loses heart and goes away. But such a question could only be answered for certain by making many careful experiments, which would not be kind.

IS IT TRUE THAT GREEN WALLPAPER POISONS US?

It is true that some kinds of green wallpaper used to be capable of poisoning people, but probably no paper of that kind is allowed to be made now in any civilised country. Green is not one of the easiest colours to obtain, even though so much of Nature is green, for the green dye of plants will not remain the same for long, and it soon changes its colour completely.

Therefore, at one time certain green salts of arsenic were used to die wallpaper and other fabrics. But arsenic in all its forms is one of the most deadly and horrible of poisons, being poisonous, indeed, to every kind of living creature.

WHAT IS VERDIGRIS?

Verdigris is the rather curious name of a particular salt or compound of the element called copper. It is a compound between copper and the acid called acetic acid, which is the acid that gives its taste to vinegar. So, in the language of chemists, verdigris is the acetate of copper. Copper is, under certain conditions, a poisonous metal, and so many people are very much afraid of verdigris when they see a film of it on copper taps, for they think they might be poisoned through drinking the water that comes from the taps. But verdigris is not nearly so poisonous as that, though no doubt it is better to keep taps clean. It has a very brilliant green colour, as we might guess if we look at the first four letters of its name, which are the French for green, and which we see in such words as verdure and verdant.

IF WE COULD GO ON TRAVELLING UPWARD, WHERE SHOULD WE END?

The word upward has no real meaning. The earth is a round ball. Upward simply means away from the ball, and we might therefore make a continuous upward journey from any point of the earth's surface, and the result would be different in every case. The upward journey from any point would, for instance, be in directly the opposite direction to the upward journey from another point exactly on the other side of the earth. For every point on the earth's surface plainly must have a point exactly opposite it, and the point opposite any other is called its antipodes, a word which means opposite the feet.

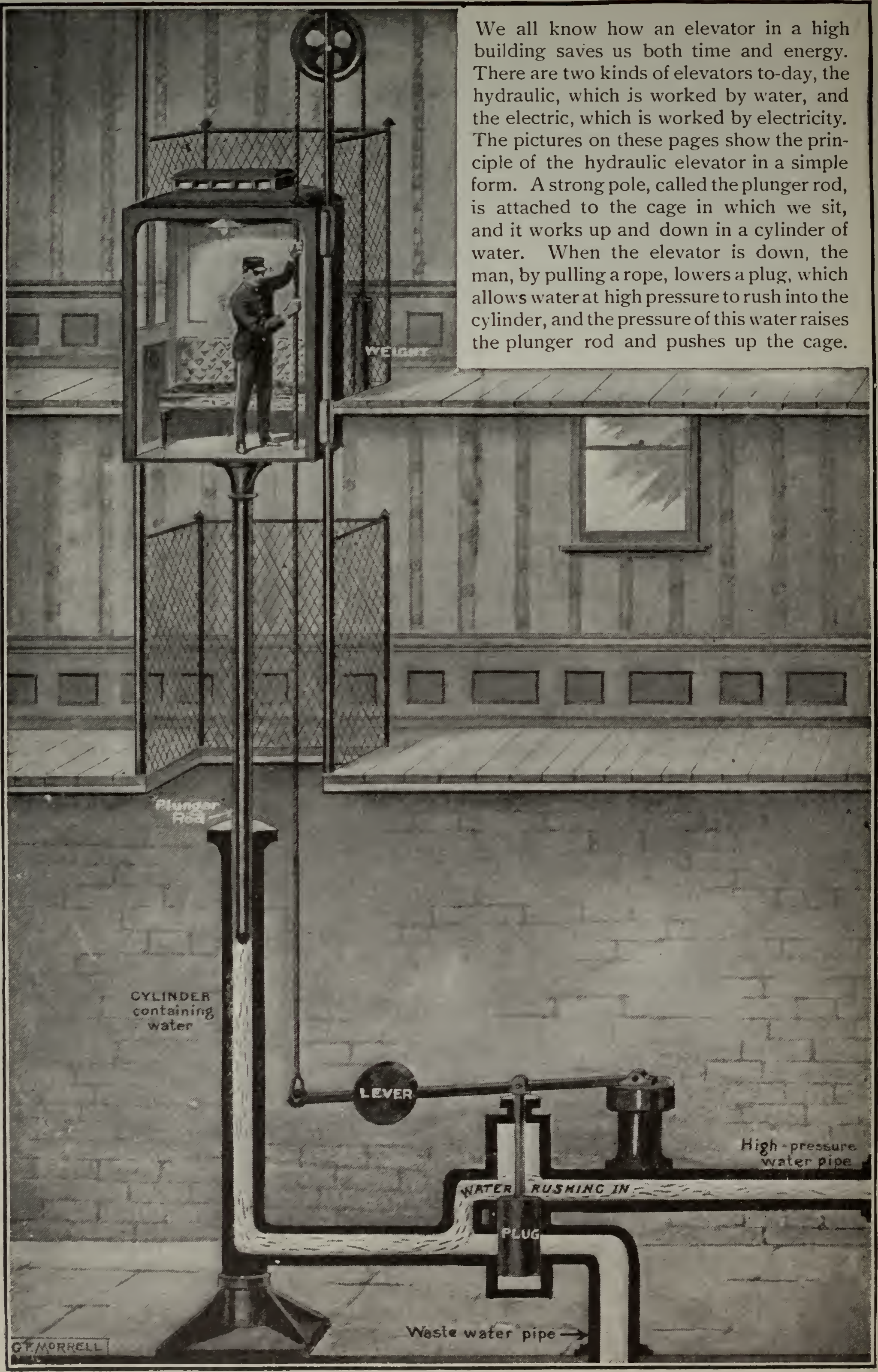
But suppose we make our question more manageable by thinking of only one point, anywhere on the earth's surface, and then asking what would be the end of a continuous upward journey from that point. Then time comes into the question, for the line of the journey would never be the same in any two seconds of time, in consequence of the various motions of the earth. But suppose we fix on a place and on a moment of time, the answer, whatever the place and the moment, will be the same—that such a journey would have no end, for we cannot imagine that space has any end at all.

IS IT GOOD TO HAVE TO WORK?

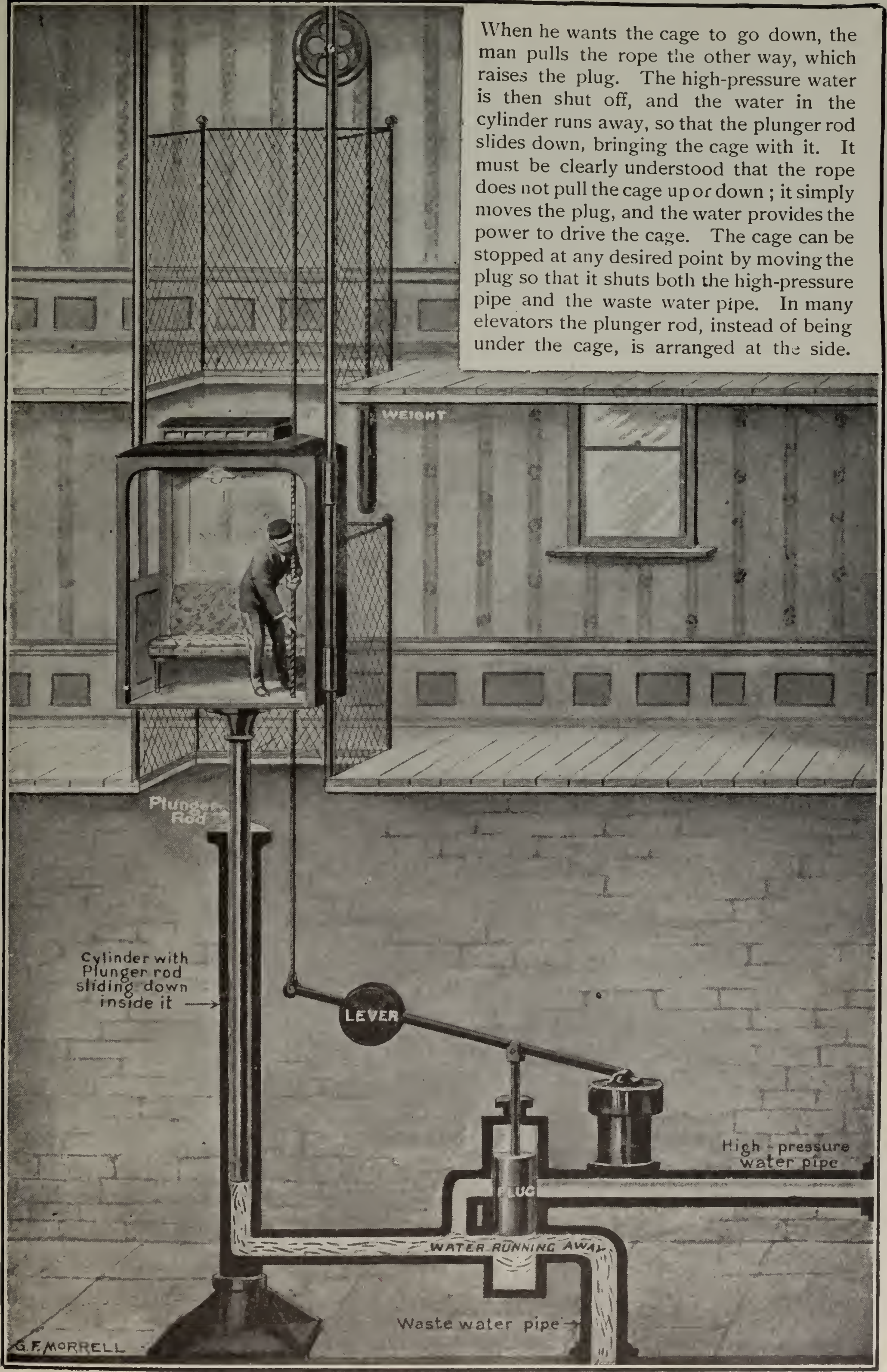
Work is a thing we all tire of at times, and we all enjoy the hour when we can stop working. We look forward to our holidays; we don't like having to get up in the morning; and we wish someone would leave us a fortune; and yet, if we have any sense at all, we know in our hearts that our work is good for us, and we see every day around us the consequences that follow when people, even those who have plenty of money to amuse themselves, have no work to do.

HOW AN ELEVATOR GOES UP AND DOWN

We all know how an elevator in a high building saves us both time and energy. There are two kinds of elevators to-day, the hydraulic, which is worked by water, and the electric, which is worked by electricity. The pictures on these pages show the principle of the hydraulic elevator in a simple form. A strong pole, called the plunger rod, is attached to the cage in which we sit, and it works up and down in a cylinder of water. When the elevator is down, the man, by pulling a rope, lowers a plug, which allows water at high pressure to rush into the cylinder, and the pressure of this water raises the plunger rod and pushes up the cage.



WHAT A PIPE OF WATER CAN DO



When he wants the cage to go down, the man pulls the rope the other way, which raises the plug. The high-pressure water is then shut off, and the water in the cylinder runs away, so that the plunger rod slides down, bringing the cage with it. It must be clearly understood that the rope does not pull the cage up or down ; it simply moves the plug, and the water provides the power to drive the cage. The cage can be stopped at any desired point by moving the plug so that it shuts both the high-pressure pipe and the waste water pipe. In many elevators the plunger rod, instead of being under the cage, is arranged at the side.

There are two classes of people with money—those who find some work for themselves, in spite of their money, and those who do not. The first are probably happier for their money; it need do them no harm, and may do them much good. But those who find no work to do are always the worse for their money. Human beings must have occupation and a purpose in life, or their lives are worth less than nothing, both to themselves and to other people.

IS IT NECESSARY FOR ALL LIVING CREATURES TO WORK?

It is not true of some of the lower forms of life, as, for instance, such cold-blooded creatures as lizards, that work is necessary to them as it is to man; it is natural to them to do nothing. They do not get bored, and their bodies do not get soft and poor, and they do not eat and drink more than is good for them. But the great mark of human beings, and especially of the highest kinds of human beings, is that they are made, in every bone and cell and impulse, to do things, to form purposes and carry them out.

When a man who has worked hard all his life retires, and is so unlucky as not to find any good hobby to work at instead of his ordinary work, and so has nothing to do, he soon discovers that all play and no work is just as bad as, or worse than, all work and no play.

WHY DOES SUGAR DISSOLVE QUICKER IN HOT WATER THAN IN COLD?

This sounds a very simple sort of question, which anyone ought to be able to answer, but, in point of fact, it is extremely difficult, and no one can answer it. We can only study the facts and hope that those who come after us will be able to add to them from the greater knowledge that they have gained, and find out the answer at last. The main fact, we know, is that what is true of sugar is true of almost everything. If it were true of everything, the case would be simpler, but there are a few things which will dissolve in cold water and not in hot water. These very curious exceptions make it all the more difficult for us to answer this question, but if only we knew more about it, we should doubtless find that they really furnish the very key to the answer.

We can see how difficult such a question as this must be when we ask ourselves what really happens when anything dissolves, or melts. If we could answer that, no doubt we could explain how different conditions affect the melting.

But how can we expect to do so while we cannot yet answer the first question—what happens when sugar melts? We know that the sugar disappears; we know that it is not gone, for we can get it back, and the water containing it is heavier by just the weight of the sugar that is melted in it. But what state the sugar is really in when it has melted we cannot say, for, of course, it is far beyond the range of our seeing.

When water is hot it takes up more room than when it is cold, and we must suppose that there is more room between the molecules of it. This should mean that there is more room to hold the molecules of sugar; and that is perhaps the best sort of a guess that we can make in answer to this very difficult question.

WHY DOES A PLANCHETTE MOVE WHEN WE PUT OUR HANDS ON IT?

The answer to this question is the same as would be the answer to the question why one person holding another person's hand can do what that other person is thinking of, without a word being said. If we have things in our minds that suggest motion or that can be expressed through any kind of muscular motion, as in going to a certain place, or in speaking, or in writing, our muscles are affected without our knowing it, by our thoughts.

We may be making no act of the will, and are quite unconscious of what is going on, but the mere fact that we have a certain thing in our minds, such as the idea of moving across to a certain part of the room, or the idea of the letters that form a certain word, is all the time affecting the muscles by which we should give expression to that idea if we chose to.

Thus, one person, without any very strong will of his own, merely by firmly keeping an idea in his head and thinking steadily of it, can make another do quite complicated things, and thus also a thing like a planchette is liable to move when we put our hands on it.

The key to all these cases is to be found in the automatic muscular movements, as they are called, of which we are, as a rule, quite unconscious, and which produce no effect upon our minds, but which are really of the greatest importance and are in constant use.

THE NEXT BOOK OF WONDER IS ON PAGE 5639.

WHAT CONFUCIUS THOUGHT

We must now study the greatest of all Chinese thinkers, whose name is reverenced to-day by at least one-fourth of all mankind, and who is one of the greatest teachers of wisdom that the world has ever seen. The real name of this great thinker is Kung; but when he grew up, and came to be reverenced as a great teacher, the Chinese called him Kung the Master, or, in their language, Kung-fu-tse. Long ago this title was turned into a Latin shape, and rendered Confucius, the name by which this great man is known throughout the western world, and the name by which we shall call him. But we must not do so without knowing that it means Kung the Master.

Just as the religion founded by Buddha is called Buddhism, so the teachings and the ideas of Confucius, making a religion of a kind, are called Confucianism. When we study Confucius as one of the great thinkers of the past, quite as far back, indeed, as any great thinker whom we have yet named, we must not make the grave mistake of supposing that we are reading about something which is really past and only ancient history.

Confucianism is a great living fact of the world of to-day; it is believed by, and it partly rules the doings of, one-fourth of all mankind. These people who believe in Confucius and his ideas are not weak people, nor people who are dying out, nor stupid people. They are probably as clever as any other men are or have been; they are multiplying very rapidly; they are very strong and hard-working; and they and their deeds and beliefs are quite certain to play as large a part in the future of the world as those of any other people. It is well to understand this when we study the great thinker called Confucius.

Thoughts are the master of things, and the thinkers are the masters of the doers; and the Chinaman Kung, born about 2,500 years ago, was not only a great thinker then, but is at this hour, and will be when we are gone, one of the great living powers that make the world what it is and what it will be. There is something shameful in the ignorance, not of children, but of grown-up people who are supposed to be educated, and who take upon themselves the duty of deciding what our children shall learn, but in whose eyes the great Confucius is nothing but a dead man much thought of by a number of yellow heathen somewhere. We know that the law of gravitation governs and helps to make the world what it is and will be, and so do the laws of chemistry, and the laws of life and death; and we are foolish unless we study and recognise the great powers such as these which make the world as it is.

One of these powers is the Chinaman Kung; and if he had never spoken a truth, or if every doctrine of Confucianism were false it would, still be our business to concern ourselves with what is the rule of life for one-fourth of all mankind. Confucius stands out as the greatest person of

CONTINUED FROM PAGE 5409

the largest empire in history; and here, in the words of a well-known student, is an account of the honour with which he is now regarded.

"His name is held in the highest honour in the whole Chinese Empire, from the highest in the land to the lowest peasant. In every city there is a temple erected at the expense of the Government for his worship. This temple contains either a statue or a tablet on which his titles are inscribed. In a hall at the rear of the chief one are tablets to certain of his ancestors and others, and also to his chief disciples. The building is generally the most conspicuous in the city, its walls being painted red. Every spring and autumn worship is paid him there by the chief officers of the city, and offerings of the fruits of the earth are set forth before him, and incense burnt. The emperor himself is required to attend in state at the Imperial College to perform these functions. Twice he kneels, and twice three times he bows his head to the ground.

"In every school in China worship is paid him, by master and scholars, on the first and fifteenth of each month, on the day of his birth, and at the opening and closing of school each year. In every village school his titles are written on red paper and affixed to the wall; and the characters on the paper mean, 'The shrine-tablet of the most accomplished, holy, first and most eminent teacher, Kung.'"

THE LIFE OF CONFUCIUS

CONFUCIUS is believed to have been born in the year 551 B.C. His father was a distinguished soldier, and, according to the Chinese, he was descended from the great emperor who, two thousand years before, had founded the Chinese Empire. When the little boy was only three his father died; and we know very little about his early education except that, according to himself, he became devoted to learning at the age of fifteen.

As is the Chinese rule, he married very young, and was a father at twenty. Soon afterwards he became an official, but spent all his available time in studying history and in thought, since he was far from satisfied with the state of things in China, and wished to learn how to reform the State, and, above all things, to serve the moral welfare of his people. At thirty he was famous, and had pupils of high rank from every part of the country.

He became what we might now call Minister of Crime and Chief Judge in his part of China, and it is said that he very nearly put an end to crime altogether. We know, however, that he did order at least one execution, but he was very much opposed to the execution of people to whom the State had not done its duty in their youth; and when a follower asked him how good government was to be obtained, he said that we must beware of the "four evils," the first of which was "Omitting to instruct the people, and then inflicting punishment on them—which means cruel tyranny."

After two thousand five hundred years we are just beginning to learn in America that Confucius was right. Hitherto we have terribly neglected our young boys and girls just after they left school, and then, when they did wrong, have punished them cruelly, usually with the result of confirming them in wrong-doing. But this, as Confucius said, is cruel tyranny; and in such matters as this we are beginning to follow the principle laid down by the Chinese Minister of Crime who lived over two thousand years before Columbus discovered America.

We also know that, as a judge, he had a great principle which is followed by the wisest of the judges in our land to-day whenever people are wise enough and fair enough to let them. "In hearing cases," said the Master, "I am like other men, but the great point is to prevent them coming into court." When people quarrel nowadays, wise judges try to have the thing settled out of court; and wise and honourable lawyers, even though they know that this course will bring them least money, always try to settle things without people going to law.

But, as in a thousand cases since, and doubtless in a thousand before—if the records were not lost in the mists of time—Confucius was too good and wise and honourable a man to be loved by all, and he had many powerful enemies, who got up an underhand plan for encouraging the prince whom Confucius served to do a disgraceful thing which stopped public business, and so utterly disgusted Confucius that he resigned his post. He started travelling, and for many years went about from one state to another throughout China with his few disciples, sometimes welcomed, often jeered at as a "stray dog," and everywhere, sooner or later, disappointed. He was always ready to advise the rulers whom he encountered, and even to help them to govern on his own high principles —but he was too great and good, and met with little encouragement. But his disciples were very faithful and were a great comfort to him, and he loved them dearly.

After many long years, when he was not far short of seventy, he returned to the State of Lu, in which he had governed, and he was allowed at Court, not as an official, but as a person who might occasionally be consulted. There he spent the last five years of his life in writing, but, as we have seen so often with these great men of long ago, none of his own writings have been preserved, and we have to trust to his disciples for our knowledge of his teaching. Here is a translation of the Chinese account of his death, which occurred in his seventy-third year:

"Early one morning he got up, and, with his hands behind his back, dragging his staff, he moved about by his door, crooning over:

The great mountain must crumble;
The strong beam must break;
And the wise man wither away like a plant.

"After a little, he entered the house, and sat down opposite the door. Tsze Kung had heard his words, and said to himself: 'If the great mountain crumble, to what shall I look up? If the strong beam break, on what shall I lean? If the wise man wither like a plant, whom shall I imitate? The Master, I fear, is going to be ill!' He then hastened into the house. The Master said: 'Tsze, what makes you so late? Last night I dreamt that I was sitting with the offerings to the dead by my side between the two pillars. Intelligent kings do not arise, and what one under Heaven is able to take me as his Master? I believe I am about to die.' With this, he took to his bed, was ill for seven days, and died."

The best translator of the works of Confucius, Dr. Legge, adds the following words in beautiful comment upon his death:

"His end was not unimpressive, but it was melancholy. He sank behind a cloud. Disappointed hopes made his soul bitter. The great ones of the empire had not received his teachings. No wife or child was by to do the kindly offices of affection for him. Nor were the expectations of another life present with him as he passed through the dark valley. He uttered no prayer, and he betrayed no apprehensions. Deep-treasured in his own heart may have been the thought that he had endeavoured to serve his generation by the will of God, but he gave no sign."

His end was not so tragic as that of Socrates, about whom we shall soon be learning; yet it belongs to the same class, and teaches us that the very greatest of men are commonly despised by their own time, and seem to have failed. Confucius, indeed, declared at the end that his life had been a failure, that he had not succeeded in his aims and ideals; but in all such cases, of which the history of thought is full, we ought to remember the words of George Eliot:

The greatest gift the hero leaves his race
Is to have been a hero. Say we fail!—
We feed the high tradition of the world;
And leave our spirits in our children's breasts!

WHAT CONFUCIANISM MEANS

CONFUCIANISM, as we have seen, is the name of the religion founded by Confucius. Since it is followed by an enormous proportion of all mankind to this very day, and shows no signs whatever of disappearing, we must learn something about it. As we shall see when we come to quote the words of Confucius himself, he did not concern himself at all with teaching about God and the future life. He was not at all a spiritual teacher in that sense, but rather a very practical one, dealing with this life and this world. We cannot say that Confucianism stands on the level of Buddhism, for instance, which, as we have seen, takes a man and asks him where his soul is going, and tells him to train it for the future. Confucius did not try to do this at all, but he concerned himself with teaching men how to live here and now. He believed in deeds, not words, and was much less concerned with what a man believes than with what he does.

He taught that goodness is worth while for itself, and also because it is the "best policy." But goodness was certainly not the best policy in that sense for himself, and we must accept with caution the idea that goodness "pays" in this life.

Nor did Confucius use any promises or threats as to a future life. Offering no future rewards or punishments, Confucianism simply teaches that men are to do good without any such motives. Confucius seems to have believed that men are born naturally good, and that their business is to keep themselves so. By following the laws of his own nature, and preserving himself from evil, a man, he said, may become "the equal of Heaven." The doctrine of Confucius, then, we are to say, is one of teaching goodness, but can scarcely be called a religion in the proper sense of the word.

Yet in a very old sense of the word Confucianism must be called a religion, because religion really means something that binds people together; and if ever there was something to bind a nation together, and make it endure, that thing is Confucianism. Above all things, Confucius insisted upon duty to parents; he was never tired of talking of this duty. In his own words it consists in "not being disobedient, in serving the parents when alive according to right conduct, when dead, in burying them according to right conduct, and in sacrificing to them according to right conduct." We may quote for ourselves one of the Ten Commandments of Israel, "Honour thy father and thy mother, that thy days may be long upon the land which the Lord thy God giveth thee." This is really the central practical doctrine of Confucius. It is now one of the roots of the Chinese character, and it is far more strictly observed and followed than any other doctrine whatever. Here, as many wise people have supposed, we have the key to the age-long endurance of the Chinese, who were a great and civilised people ages before a single person in Europe could read or write; who have seen one great empire after another, like Greece and Rome and Spain, come into being, and disappear; and who still endure to-day, and are waking again after a long sleep, which was sleep and not death.

CONFUCIUS

If a nation is to go on, everything depends upon its parents and its children. The great doctrine of Confucius that parents are to be honoured is therefore a thing which binds a people together and makes them strong and lasting. When we study the oldest practices of men, we find, in varying degree in all times and places, something which we may generally call ancestor-worship. The rudest savages, we find, will make offerings to the spirits of the dead. Very often ancestor-worship has foolish and wicked things in it. For instance, men believe that the dead are evil spirits; and often in ancestor-worship the living are killed to honour or to please the dead. All that is horrible. But what we may say of Confucius is that he took the old ancestor-worship which, in one shape or another, is common to mankind everywhere, and he purified it, made it good and beautiful and practical, and took away from it the bad and evil parts that had disfigured it. And so the days of the Chinese have been long in their land, and in that sense they have fulfilled the promise given in the commandment from our own Bible. This great teaching makes the family strong; and it is a certain rule of mankind in all times and places that where the family is strong the nation is strong, and where the family is weak the nation is weak. We must remember that, as ancestor-worship exists in China, it works in both directions. According to the Chinese belief and practice, which we must mainly trace to Confucius, parents are cared for and respected and worshipped by their children; and when they die, their children will honour them, will bury them with honour, and will protect their graves and keep them sacred. This means that children are specially precious. A man must have children. Thus all Chinese marry very early, for it is a great disaster to die without children. Thus, also, marriage and the family are greatly honoured.

We have only to think a little to understand the great value for a nation of beliefs and practices which make children precious to parents, and parents honoured by their children. Nor was this the only way in which Confucius taught people to be careful of the young, to honour them, and to pay regard to them. Just as a great Roman writer did many centuries later, he taught that the young were to be honoured, and he gave a very good reason for it. He is reported to have said the following words: "Reverent regard is due to the young.

How know we what difference there may be in them in the future from what they are now? Yet when they have reached the age of forty or fifty, and are still unknown in the world, then indeed they are no more worthy of such regard."

Here are some of the most famous teachings of Confucius on the great and all-important duty of honouring parents, and also one's brothers, those who are the children of the same parents as ourselves.

"Reverence to parents and friendly consideration among brothers are a root of the right feeling which is owing everywhere from man to man."

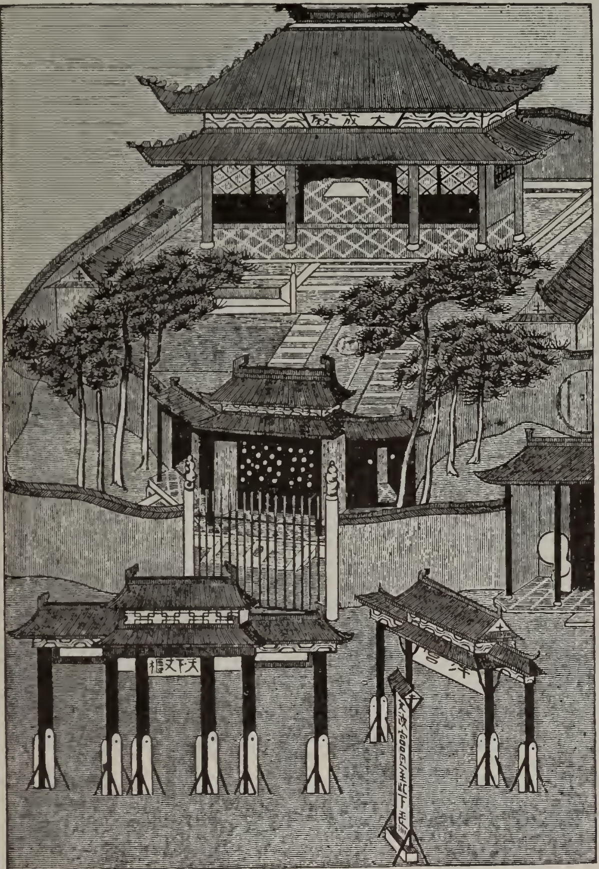
"Let young people show filial piety at home, respectfulness toward their elders when away from home. Let them be cautious and truthful, their love going out freely toward all, cultivating good-will to men. And if in such a walk there be time or energy left for other things, let them employ it in wise reading and acquiring accomplishments in art and in music."

"He who, after three years' observation of the will of his father when alive, or of his past conduct, if dead, does not turn aside from that father's ways is entitled to be called a dutiful son."

"Parents ought to be allowed by children to bear only one trouble, that of their own sickness."

"At the present time filial piety means merely supporting one's aged parents, but the dogs and horses they possess do something to support them also. If the children have no reverent devotion in the matter, how are they better than the dogs and horses? Merely to work for old people, and to set meat and drink before them—that alone is not honouring one's parents."

"A son, in ministering to aged parents, may sometimes give them gentle advice. But if they do not heed it he must still show them reverent aspect, and if he has to suffer he must do so without murmuring. While his parents are still alive he should not wander far, but if he does he should always let them know where they can find him. A son should not forget how old his parents are. He should rejoice that their years are so many, since they have lived so long, but he should be sorry also, since so few years can remain to them."


AN ANCIENT TEMPLE ERECTED TO CONFUCIUS

"In regard to the aged, we are to give them rest; in regard to friends, we are to show them sincerity; in regard to the young, we are to treat them very tenderly."

"What has the noble man to do with being distressed because he has no brothers? All men between the four seas are his brothers."

There are beautiful and eternal thoughts among those which we have quoted; but we must recognise that the teaching of Confucius on these subjects was not by any means perfect, and there were some great flaws in it.

The gravest of these, beyond a doubt, is the very different level on which he places brothers and sisters. To him, and to the Chinese in general, a little girl is practically nothing. He frequently speaks of brothers and their duties, but he never mentions sisters at all. The all-important thing is that a man shall marry and have sons; if he has merely daughters it is as if he had no children at all. It is, above all, the father, rather than the mother, who is to be honoured. There is something terribly wrong about a system which places brothers and sisters on different levels, so that girl babies are despised, and very often are not allowed to live.

It has often been declared that Confucius laid down for his followers what we call the Golden Rule—that we are to do to others what we would have them do to us. This has more especially been said by those who desired to show that Confucianism reached the level of Christianity. But when we study the actual words of Confucius, so far as they are reported to us by his disciples, we find that there is a notable difference.

In one case Confucius was asked: "Is there one word upon which the whole life may proceed?" And he replied: "Is not reciprocity such a word?—what you do not yourself desire, do not put before others."

But Confucius does not say that we are to do good as we would like people to do us good. He only goes so far as to say that we are not to do to other people what we would not like them to do to us. This point is worth remembering, because it is so very often referred to when people are comparing one religion with another.

SOME SAYINGS OF CONFUCIUS

Here are some more of the thoughts of Confucius, chosen from the famous book called the Analects, or Gatherings, in which his followers collected what they remembered of his sayings:

"Sincerity is the end and beginning of things; without sincerity there would be nothing."

"When a man feels the difficulty of doing, can he be other than cautious and slow in speaking?"

"The man of virtue makes the difficulty his first business, and success only a subsequent consideration; this may be called perfect virtue. If doing what is to be done be made the first business, and success a secondary business, is not this the way to exalt virtue? To assail one's own wickedness and not that of others, is not this the way to correct evil?"

"Those who know the truth are not equal to those that love it; and they that love it are not equal to those who find delight in it."

"If Heaven had wished to let the cause of truth perish, then I, a mere mortal, should not have been bound up with it. While Heaven does not let the cause of truth perish, what can the people do to me?"

"To give oneself earnestly to do the duties due to men, and while respecting the spirits, to keep aloof from them, may be called wisdom."

"The wise find delight in water; the virtuous find delight in hills. The wise are tranquil; the virtuous are active. The wise are joyful; the virtuous are long-lived."

"He with whom neither slander that gradually soaks in nor statements that startle like a wound in the flesh are successful may be called intelligent indeed. Yes; the man with whom neither soaking slander nor startling statements are successful may be called far-seeing."

"He who offends against Heaven has none to whom he can pray."

"Man is born for uprightness."

"Hard is the case of the man who stuffs himself with food the whole day without applying his mind to anything. Are there not gamesters and chess-players? To be one of these would still be better than to be doing nothing at all."

"Not to withdraw after making an error is itself a new error."

"Whatever the mind may attain to, unless the goodness within is powerful enough to keep guard over it, is assuredly lost even though it be gained."

"Shall I teach you what knowledge is? When you know a thing, to hold that you know it; and when you do not know a thing, to allow that you do not know it. That is knowledge."

"At a funeral it is better that there be deep sorrow than a minute attention to ceremony."

"The difference between the great man and the ordinary man is that the great man has a fair mind which sees all sides, and the common man has a mind which is partisan and one-sided."

"To see the right, and not to do it, is to be a coward."

"Four of the marks of a superior man are: In his conduct of himself he is humble; in serving his superiors he is respectful; in nourishing the people he is kind; in ordering the people he is just."

CONTINUED ON PAGE 5703

A LINE OF SUBMARINES MOVING RAPIDLY THROUGH THE WATER

MEN BENEATH THE WATERS

THE UNSEEN SHIP WITH THE WONDERFUL EYE

CONTINUED FROM PAGE 5556.

Most boys delight to read some of the books written by the famous French writer, Jules Verne, who died a few years ago. He wrote scientific tales, describing marvels which, at the time, nobody thought would be achieved. In 1873 he wrote a fascinating tale called "Twenty Thousand Leagues Under the Sea." That, in his day, seemed as impossible as the rest of his tales. To-day it is no longer impossible. We have a small number of ships in our Navy which, if they cannot travel 20,000 leagues under the sea, can travel beneath the waves almost as easily as they can travel on the surface.

These ships we call submarines. The name means, of course, that they can travel beneath the surface of the waves. Those of us who were fortunate enough to see the manœuvres some time ago know what these submarines are like. They are singular-looking vessels—long, shaped like a cigar, but flat on the top to afford standing-place for the officers and men.

In the middle of the deck is a little tower, called a conning-tower, and this is the only way into the boat for the crew. The observer notices also, rising from the vessel, something which looks like a tiny lighthouse. The important purpose which this serves we shall presently see. What work does this strange little vessel perform? The submarine is a vessel of war. Suppose a hostile fleet should come to attack some large port, the submarines would be among the most important vessels sent out to defend the port. The submarine would steal quietly out of harbour, and perhaps might travel along on the surface of the sea. As soon as a hostile vessel was approached, down into the sea the submarine would go. But, quickly as it would disappear, the submarine would not dive until proper preparations had been made.

The first thing to be done would be for all the men to go inside and close the door in the conning-tower, so making the vessel perfectly water tight. And then the craft would be steered under water, with a careful officer to issue instructions as to which way it should go. Of course, the submarine has engines to make it go, but these are driven, not by steam, but by petrol or gasolene. It has the ordinary propeller and the ordinary rudder to steer it, but it has also two other rudders, which work, not vertically, but horizontally, to make the ship dive down or come up.

Still, even with diving rudders of this sort, we cannot by ordinary means make a floating vessel keep under water, so we have to increase the weight of the vessel. Therefore valves are opened in the submarine, and through these the sea-water rushes in and fills tanks built to receive it. When sufficient water has been taken in to make the vessel sink to a certain depth, the valves are closed, and then the vessel works along under water at about ten or eleven miles an hour.

THE BRAVE MEN WHO LIVE IN THE LITTLE BOAT UNDER THE SEA

Inside the ship there are about a dozen men, including two officers—brave fellows all. They have to remain in this ship under water where no air can reach them. To enable them to do so, the ship carries compressed air, which is released, a little at a time, from special chambers, while the air which has become foul from having been breathed is, like the exhaust gases from the engine, driven out of the ship. The men may have to stay for hours and hours under water, so they have all necessary supplies of food and water with them.

When, all unseen, they creep under water up to the ship which they are sent to attack, they fire a torpedo at it, and destroy it. That, at any rate, is what they are supposed to do. When their work is done, they force out the water contained in the tanks and drive the submarine up to the surface of the sea, open the doorway in the conning-tower, and admit fresh air.

It is impossible to describe all the wonders concealed within the iron walls of a submarine, but we must not omit some other features of the work done by compressed air. This, as we have seen, becomes the atmosphere which the men have to breathe. When released from its chambers, it expands and becomes as ordinary air. While still compressed, it is the force used to drive out the water from the tanks. And should the submarine become stuck in the mud at the bottom of the sea, it is the compressed air which blows the mud away and releases the ship, enabling it to rise again.

THE UNSEEN DANGERS OF THE DEEP WHICH THE SUBMARINE HAS TO FACE

There have been many accidents to submarines, and many brave members of the submarine crews have lost their lives through their devotion to duty. In most cases the accidents have occurred through the submarine running into something, or through something running into the submarine. It is easy to understand how such accidents happen. The men in a submarine beneath the water cannot see what is taking place on the surface of the sea. It is possible for the officer who stands on the tiny tower, which generally projects out of the water when the ship itself is only just under the surface, to observe what is happening on the surface of the sea; but if the submarine is travelling at a greater depth there can be no look-out on the tower, and direct observation can only be made through glass windows looking out into the depths of the sea.

But a clever inventor has overcome the difficulty. He has given to the crew of the submarine a wonderful eye by means of which they can see from the depths of the sea what is going on at the surface of the water. When the submarine is deep down in the sea, this wonderful instrument shows the officer what is happening in the world above, for as great a distance as thirteen miles all around.

The sailor on an ordinary ship and the ordinary individual on land can see in front of him, and to each side, but if he wants to see behind him he must turn round. But the submarine sailor can see on all sides of him by simply looking straight in front of him.

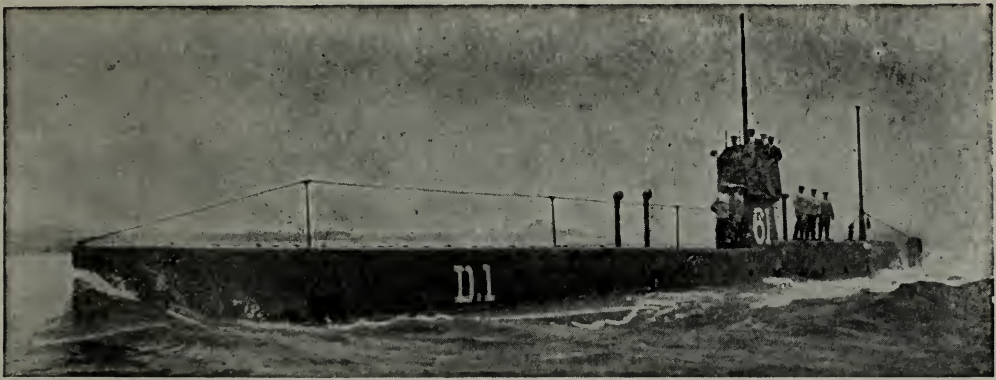
THE WONDERFUL EYE OF THE SUBMARINE THAT CAN SEE ALL AROUND

What is the marvellous instrument that gives him this power, as though he had a third eye ? It is called the periscope, a word that comes from two Greek words, *peri*, around, and *skopo*, I look. It is an instrument that *looks around.* We can understand how it works by looking at the pictures on these pages.

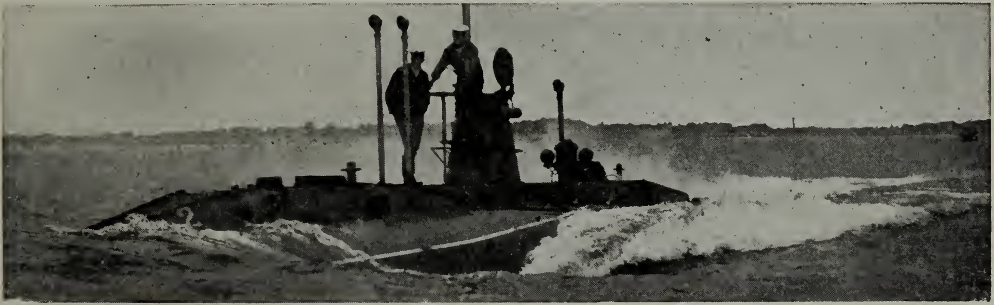
The appearance will suggest a small lighthouse, but instead of shedding forth light to enable people outside to see, it brings the pictures of outside objects inside, so that those inside may see what is outside. The periscope is a long tube that projects from the submarine, above the surface of the sea. Near the top is a lens in the form of a ring. This is an eye that sees in every direction at once.

From horizon to horizon, the image of whatever is visible passes into this ring-shaped lens, and is reflected down the tube on to a flat surface below, as seen in the picture on page 5592. The officer and crew of the submarine, by looking at the flat surface upon which the images of things above are reflected, see what is happening all around them, and know what dangers to avoid and what course to take. By means of this new invention the safety of the submarine will be greatly increased, and fewer lives will be lost.

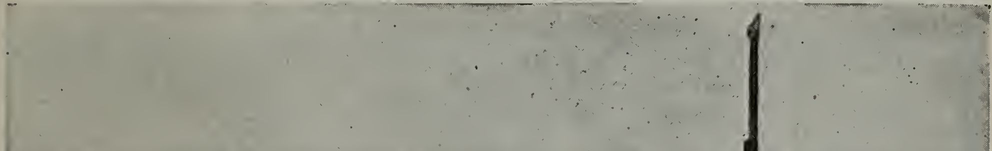
THE SHIPS THAT FIGHT UNDER THE SEA



Twenty years ago a ship that could travel under the sea was a mere dream of the storytellers, but to-day every big navy has its fleets of submarine vessels, and they are familiar objects at all our naval ports. Here we see the very latest type of modern submarine, a large and swift vessel, that can sink a battleship, while itself keeping out of sight.

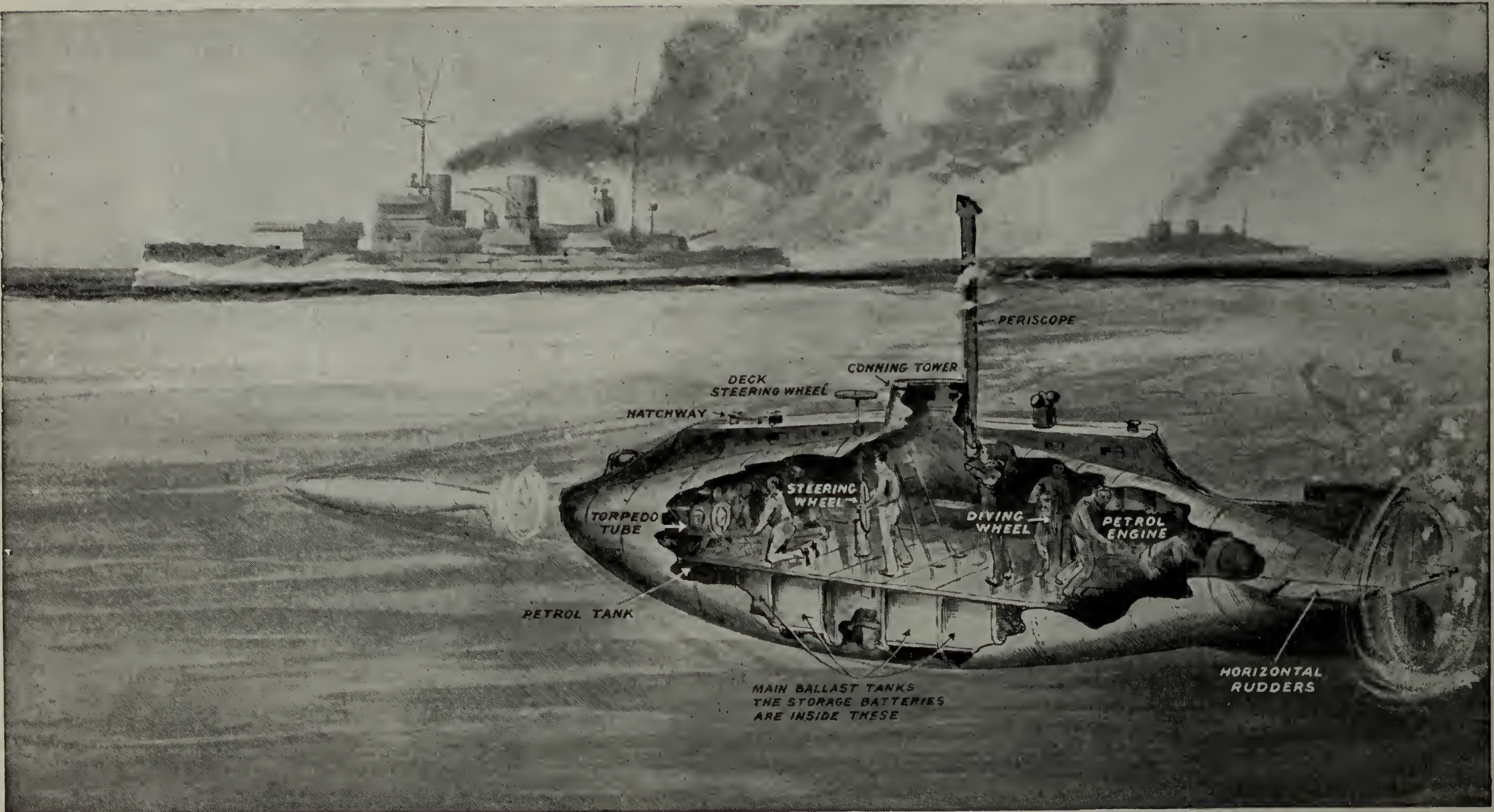


This is an earlier and smaller type of submarine boat, known, from the name of its inventor, as the Holland type. The vessel is travelling at full speed while half submerged, and some members of the crew are seen standing on deck. But, if necessary, the boat can sink beneath the waves and completely disappear from sight in a minute or two.



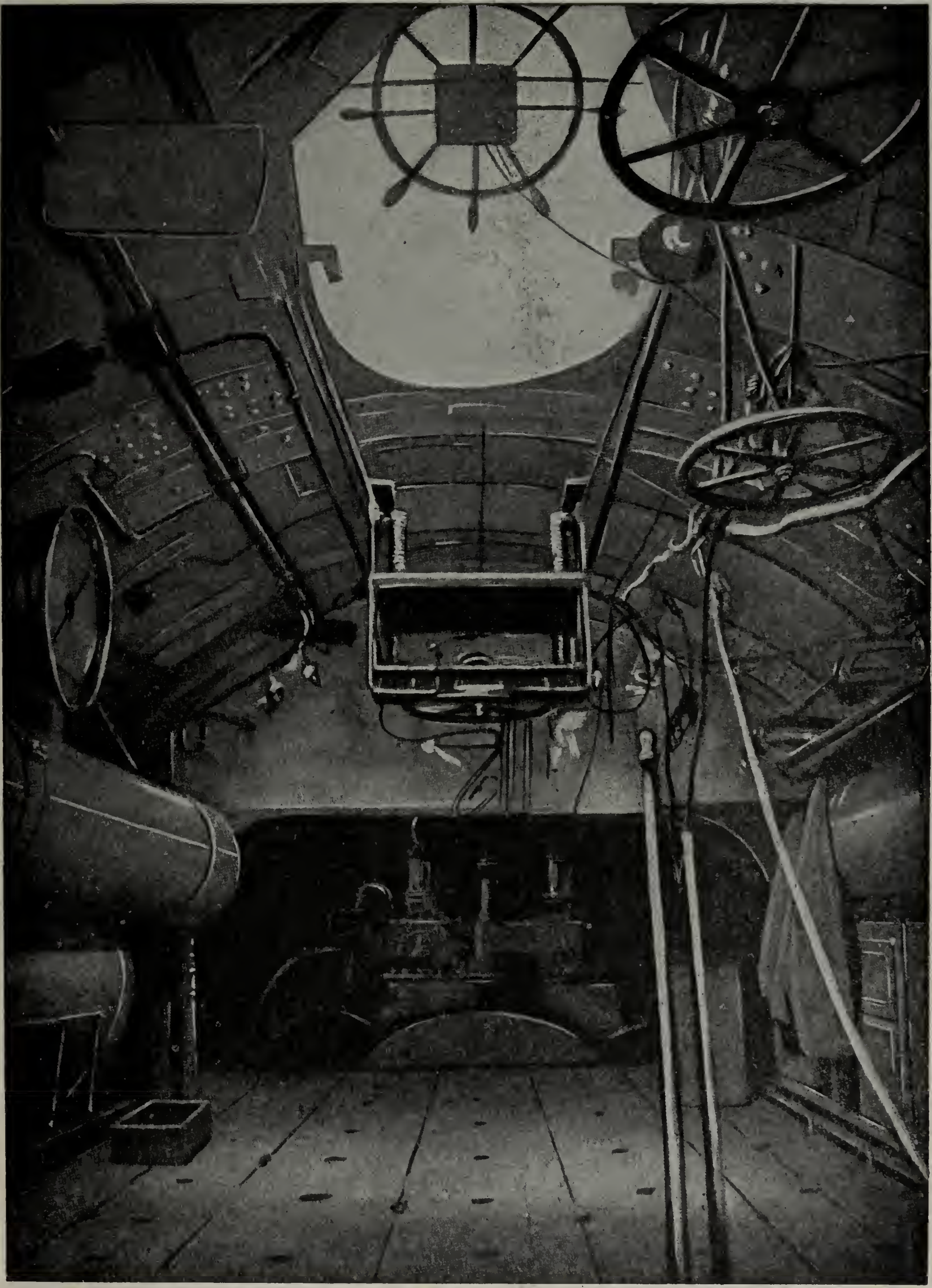
Here we see another type of submarine, with only its conning-tower visible above the water. It is about to take the final plunge beneath the waves, with its crew of sixteen officers and men, who, in actual war, could then do their deadly work unseen by the enemy. The conning-tower has a steel lid to resist the pressure of the water.

THE TERRIBLE ENEMY THAT LIES HIDDEN IN THE SEA



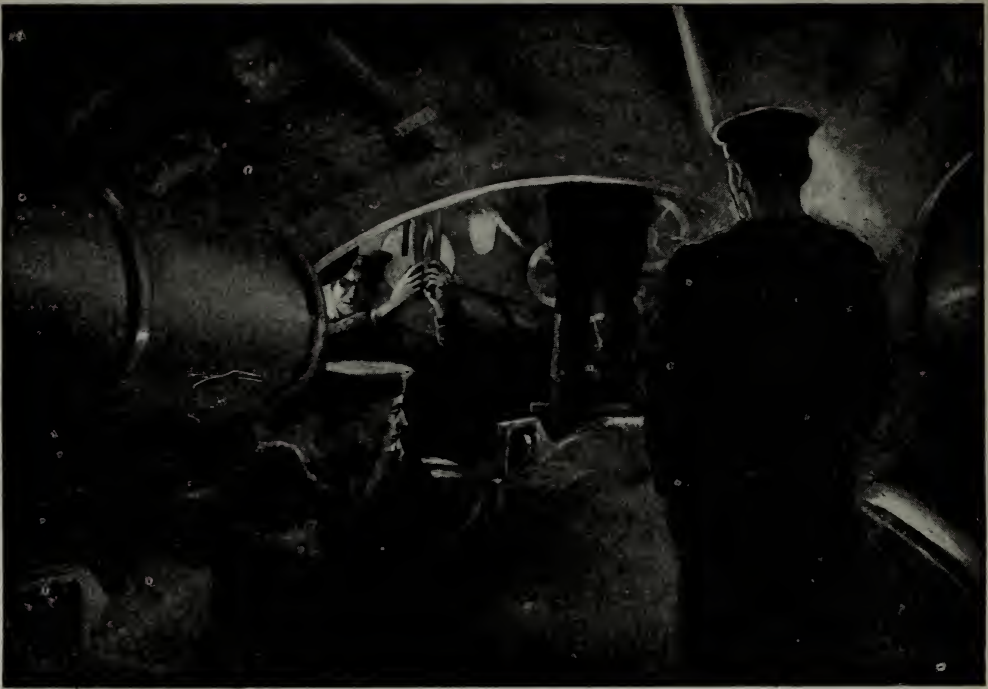
Here we see a submarine in actual war. It is attacking a battleship, and has just struck the great vessel with a torpedo. But the battleship is unable to reply, for the mysterious submarine is hurling its death-dealing missiles beneath the waves, quite out of sight of its opponent. The artist has drawn the submarine in section to show what the inside is like. When a ship is moving, a torpedo is never fired directly at her. A torpedo travels very slowly compared with a shot from a gun, and because of this, a ship could steam out of danger if the torpedo were aimed directly at her. It is therefore aimed a little ahead of the ship, so that the vessel and the torpedo may reach the same spot together and thus the torpedo may strike the vessel and sink it.

THE INSIDE OF A SUBMARINE BOAT

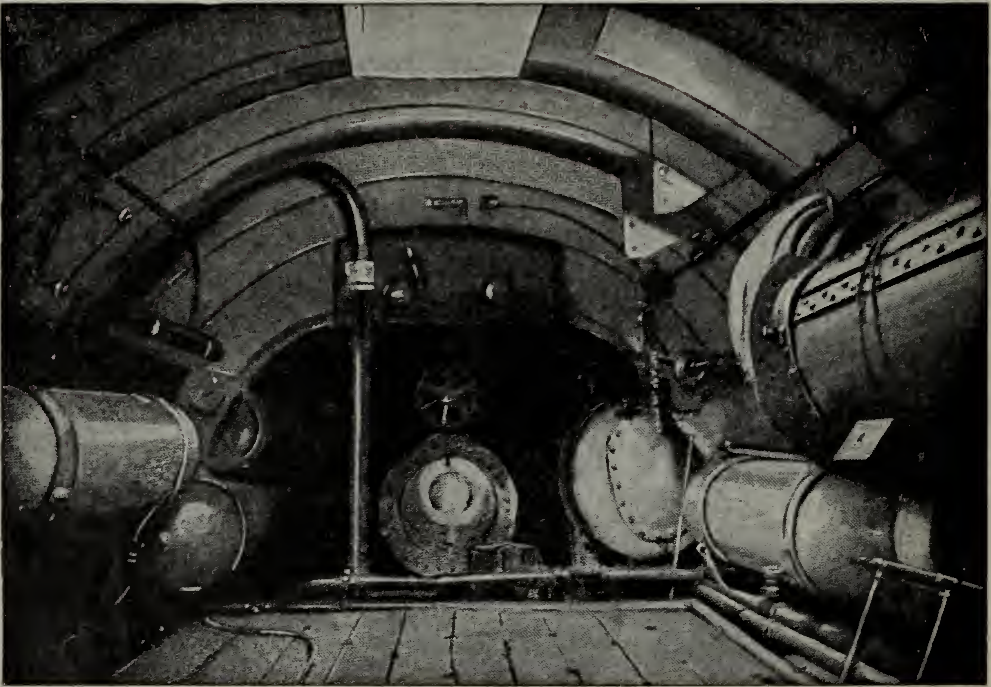


There is no more jealously guarded secret in the world than the exact arrangement and details of the inside of a submarine. Every navy preserves the mystery of its own particular type of boat, and this fact makes the picture on this page all the more wonderful, for it is an actual photograph of the inside of a submarine boat—one of the few photographs of its kind ever taken. The curious little platform in the centre of the picture is the place from which the commanding officer controls the boat, and directly above is the steering wheel. The wheels to the right are for controlling the vessel when it is diving or rising to the surface, and on the left is the indicator which shows by a glance at any and every moment the exact depth the boat is below the surface of the sea.

A FIGHTING SHIP BENEATH THE WAVES



Here we see how the crew of a submarine use their deadly weapons in case of attack by an enemy. They are just firing a torpedo from the forepart of their vessel, and this, if well aimed, may sink some mighty battleship that has cost, perhaps, ten million dollars. The men appear to be cramped for room, but on a submarine every inch of space has to be used with the greatest economy. The legs of the captain can be seen on his platform.

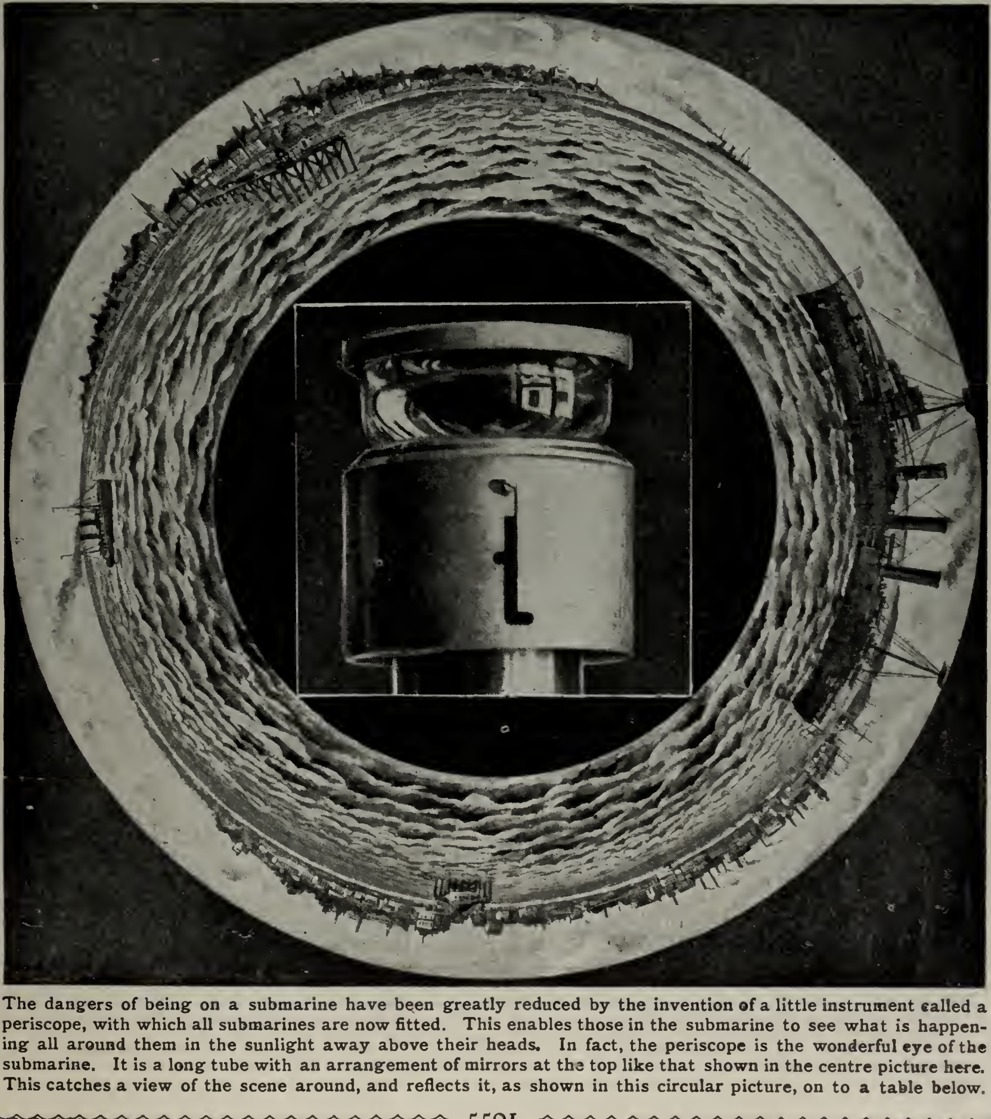


In this picture we are looking right into the bow, or nose, of the submarine, and in the centre is the tube through which the torpedo is sent on its deadly journey. To the right and left are large tanks of compressed air. This is needed for breathing purposes, and for firing the torpedoes. Each submarine carries five torpedoes, every one of them capable of sinking a huge battleship, although, of course, in war-time many of them miss their mark and are lost.

THE WONDERFUL EYE OF THE SUBMARINE

This officer is watching the manometers, which are instruments to tell whether the air in the submarine is keeping pure enough for the crew to breathe with safety.

The sailors in this picture are just launching a torpedo on its journey of death beneath the sea. Nothing can resist this terrible instrument if it once hits the mark.

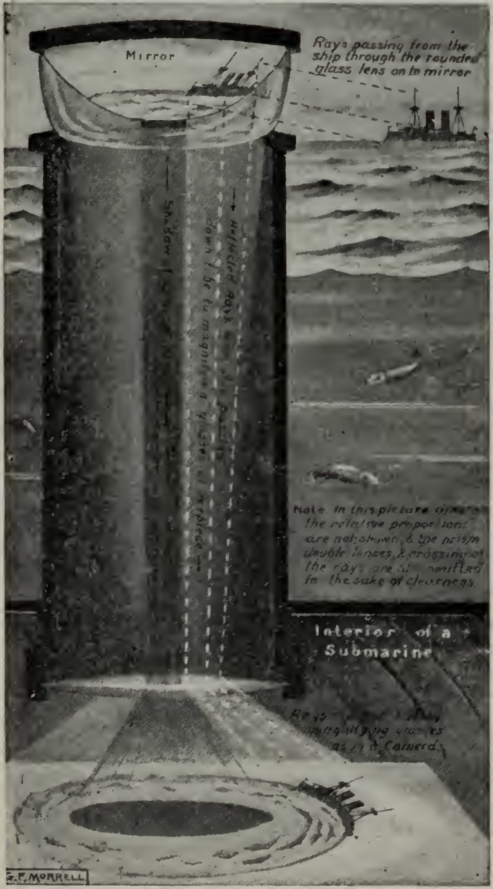


The dangers of being on a submarine have been greatly reduced by the invention of a little instrument called a periscope, with which all submarines are now fitted. This enables those in the submarine to see what is happening all around them in the sunlight away above their heads. In fact, the periscope is the wonderful eye of the submarine. It is a long tube with an arrangement of mirrors at the top like that shown in the centre picture here. This catches a view of the scene around, and reflects it, as shown in this circular picture, on to a table below.

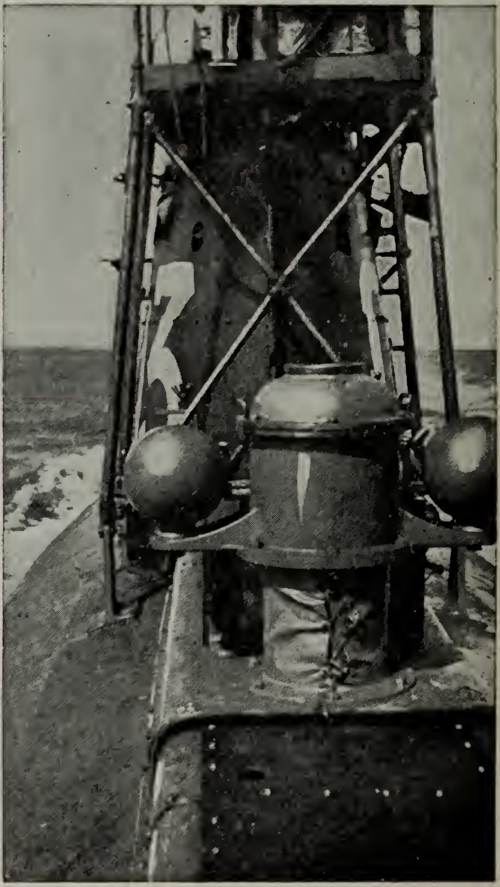
LOOKING OUT ABOVE AND BELOW THE WAVES

Here we see the officers of a submarine studying the picture of what is happening above, which the periscope has reflected upon the table, somewhat in the same way as a picture is thrown upon the sheet by a magic lantern.

These men are taking a last look round before sinking. Air-compressors maintain the supply of air in a submarine. Formerly, white mice used to be kept on board to indicate, when they fainted, that the air was getting foul.


Mirror
Rays passing from the ship through the rounded glass lens on to mirror
Shadow
Reflected Rays
Note. In this picture ... the relative proportions are not shown, & the prism double lenses, & crossing of the rays are all omitted for the sake of clearness
Interior of a Submarine
Camera
G.F. MORRELL

In this picture we see how the periscope works. The ship on the waves is seen by the lens of the periscope, and the picture is reflected down the tube on to the table.



This picture of the conning-tower and the apparatus on deck shows the massiveness of the most modern kind of submarine. New and larger types are constantly being built.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 5677.

Victor Hugo, whose countrymen of France admired him most as a poet and a writer of plays, is famous to the rest of the world chiefly as a great novelist. But even his stories and romances are instinct with what we call poetry, for they are all so highly touched with imagination that they carry the mind of the reader away from the realities of every day into the realm of imagined things. That is to say, he is still a poet when he is writing prose, for all his stories have an element of grandeur which is truly poetic. His great novel, "Ninety-three," is a tale of the most dramatic character, describing that terrible year, 1793, when the French Revolution reached the height of its fury. No other writer could so well have reflected the unrest of the period as Victor Hugo, and in reading "Ninety-three" we feel something of what those who lived at that time must have felt, for the imagination of the poet-novelist enables him to live the past over again, and to impress his vision of it on the minds of his readers. The following vivid description of a cannon that broke loose on board a ship of war is translated from "Ninety-three."

A FIGHT WITH A CANNON: By VICTOR HUGO

La Vieuville's words were suddenly cut short by a desperate cry, and at the same instant they heard a noise as unaccountable as it was awful. The cry and this noise came from the interior of the vessel.

The captain and lieutenant made a rush for the gun-deck, but could not get down. All the gunners were hurrying frantically up.

A frightful thing had just happened.

One of the carronades of the battery, a twenty-four pounder, had got loose.

This is, perhaps, the most formidable of ocean accidents. Nothing more terrible can happen to a vessel in open sea and under full sail.

A gun that breaks its moorings becomes suddenly some indescribable supernatural beast. The mad mass has the bounds of a panther, the weight of the elephant, the agility of the mouse, the obstinacy of the ox, the unexpectedness of the surge, the rapidity of lightning, the deafness of the tomb. It weighs ten thousand pounds, and it rebounds like a child's ball. Its flight is a wild whirl abruptly cut at right angles. What is to be done? How to end this?

You can make a mastiff hear reason, astound a bull, fascinate a boa, frighten a tiger, soften a lion; but there is no resource with that monster—a cannon let loose. You cannot kill it—it is dead; at the same time it lives.

The horrible cannon flings itself about, advances, recoils, strikes to the right, strikes to the left, flees, passes, disconcerts ambushes, breaks down obstacles, crushes men like flies.

In an instant the whole crew were on foot. The fault was the chief gunner's; he had neglected to fix home the screw-nut of the mooring-chain, and had so badly shackled the four wheels of the carronade that the play given to the sole and frame had separated the platform, and ended by breaking the breeching. The cordage had broken, so that the gun was no longer secure on the carriage. As a heavy wave struck the port, the carronade, weakly attached, recoiled, burst its chain, and began to rush wildly about.

Then arose the cry of distress which had been heard. The men rushed toward the ladder; the gun-deck emptied in the twinkling of an eye. The enormous cannon was left alone. She was given up to herself. She was her own mistress, and mistress of the vessel. She could do what she willed with both. This whole crew, accustomed to laugh in battle, trembled now.

All were silent; the cannon kept up its horrible fracas.

The waves beat against the ship; their blows from without responded to the strokes of the cannon.

It was like two hammers alternating.

Suddenly, into the midst of this sort of inaccessible circus, where the escaped cannon leaped and bounded, there sprang a man with an iron bar in his hand. It was the author of this

CONTINUED FROM PAGE 5509

catastrophe—the gunner whose culpable negligence had caused the accident; the captain of the gun. Having been the means of bringing about the misfortune, he desired to repair it. He had caught up a handspike in one fist, a tiller-rope with a slipping noose in the other, and jumped down into the gun-deck.

Then a strange combat began, a Titanic strife—the struggle of the gun against the gunner; a battle between matter and intelligence; a duel between the inanimate and the human.

The man was posted in an angle, the bar and rope in his two fists; backed against one of the riders, settled firmly on his legs as on two pillars of steel, livid, calm, tragic, rooted, as it were, in the planks, he waited.

He waited for the cannon to pass near him.

The gunner knew his piece, and it seemed to him that she must recognise her master. He had lived a long while with her. How many times he had thrust his hand between her jaws! It was his tame monster. He began to address it as he might have done his dog.

"Come!" said he. Perhaps he loved it.

He seemed to wish that it would turn toward him.

But to come toward him would be to spring upon him. Then he would be lost. How to avoid its crush? There was the question. All stared in terrified silence.

Not a breast respired freely, except perchance that of the old man who alone stood in the deck with the two combatants, a stern second.

He might himself be crushed by the piece. He did not stir.

Beneath them the blind sea directed the battle.

At the instant when, accepting this awful hand-to-hand contest, the gunner approached to challenge the cannon, some chance fluctuation of the waves kept it for a moment immovable, as if suddenly stupefied.

"Come on!" the man said to it. It seemed to listen.

The struggle began—struggle unheard of. The fragile matching itself against the invulnerable. The thing of flesh attacking the brazen brute. On the one side blind force, on the other a soul.

The whole passed in a half-light. It was like the indistinct vision of a miracle.

An end of broken chain remained attached to the carronade. This chain had twisted itself, one could not tell how, about the screw of the breech-button. One extremity of the chain was fastened to the carriage. The other, hanging loose, whirled wildly about the gun and added to the danger of its blows.

The screw held it like a clinched hand, and the chain, multiplying the strokes of the battering-ram by its strokes of a thong, made a fearful whirlwind about the cannon—a whip of iron in a fist of brass. This chain complicated the battle.

Nevertheless, the man fought. Sometimes, even, it was the man who attacked the cannon. He crept along the side, bar and rope in hand, and the cannon had the air of understanding, and fled as if it perceived a snare. The man pursued it, formidable, fearless.

Such a duel could not last long. The gun seemed suddenly to say to itself, "Come, we must make an end!" and it paused. One felt the approach of the crisis. The cannon, as if in suspense, appeared to have, or had—because it seemed to all a sentient being—a furious premeditation. It sprang unexpectedly upon the gunner. He jumped aside, let it pass, and cried out, with a laugh, "Try again!" The gun, as if in a fury, broke a carronade to larboard; then, seized anew by the invisible sling which held it, was flung to starboard toward a man, who escaped.

Suddenly it darted upon him. The gunner avoided the shock.

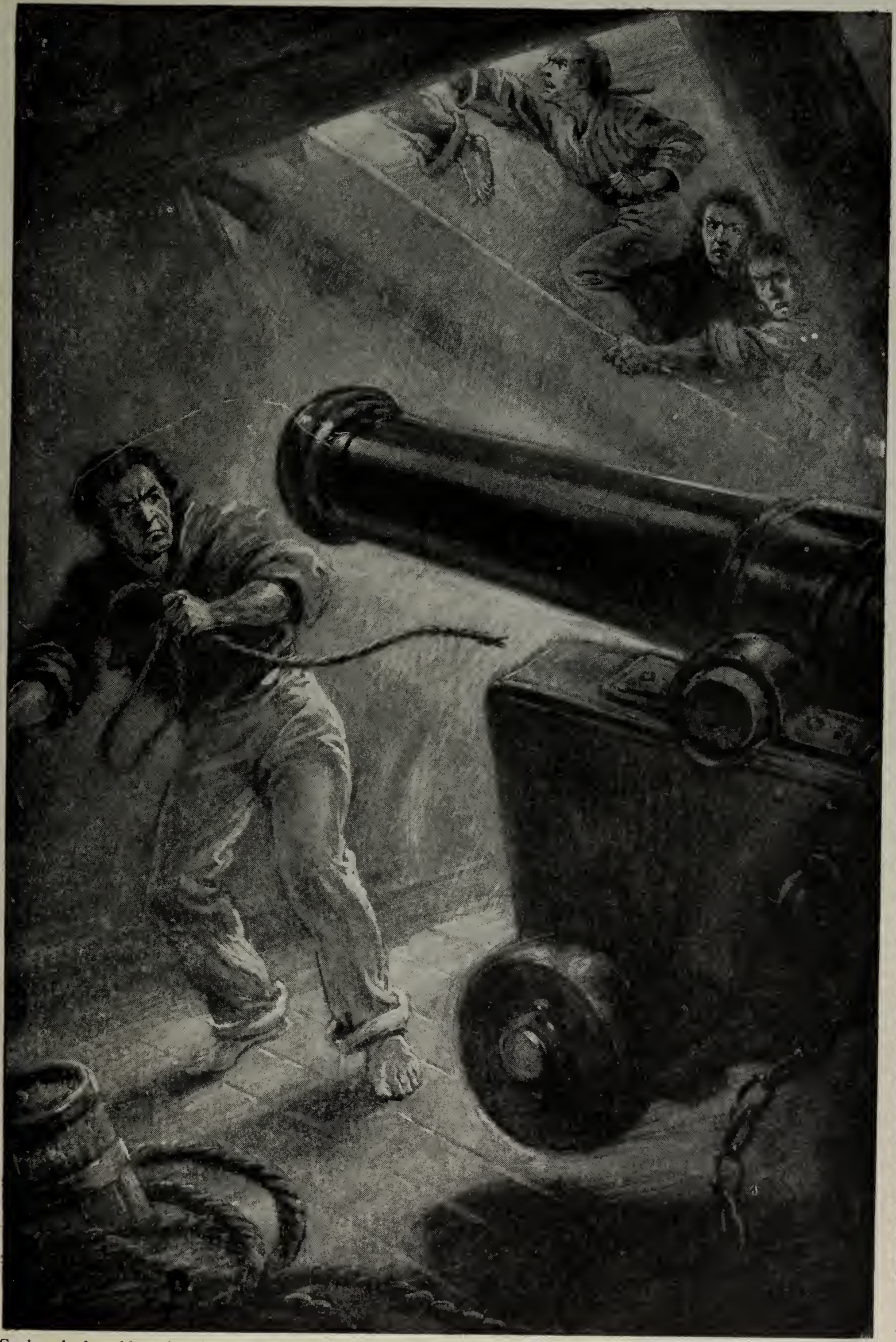
Three carronades gave way under the blows of the gun; then, as if blind and no longer conscious of what it was doing, it turned its back on the man, rolled from the stern to the bow, bruising the stem and making a breach in the plankings of the prow. The gunner had taken refuge at the foot of the stairs, a few steps from the old man who was watching.

The gunner held his handspike in rest. The cannon seemed to perceive him, and, without taking the trouble to turn itself, backed upon him with the quickness of an axe-stroke. The gunner, if driven back against the side, was lost. The crew uttered a simultaneous cry.

But the old passenger, until now immovable, made a spring more rapid than all those wild whirls. He seized a bale of the false assignats, and, at the risk of being crushed, succeeded in flinging it between the wheels of the carronade.

The bale had the effect of a plug. A pebble may stop a log, a tree-branch turn

THE GUN SPRANG SUDDENLY UPON HIM



Such a duel could not last long. As the gun sprang unexpectedly upon the gunner he jumped aside, let it pass, and cried, with a laugh, "Try again!" Suddenly, as if in a fury, it darted upon him, but the gunner avoided the shock.

an avalanche. The carronade stumbled. The gunner, in his turn, seizing this terrible chance, plunged his iron bar between the spokes of one of the hind wheels. The cannon was stopped.

It staggered. The man, using the bar as a lever, rocked it to and fro. The heavy mass turned over with a clang like a falling bell, and the gunner, dripping with sweat, rushed forward headlong and passed the slipping noose of the tiller-rope about the bronze neck of the overthrown monster. It was ended. The man had conquered. The ant had subdued the mastodon; the pygmy had taken the thunderbolt prisoner.

THE PLAGUE-STRICKEN HOME: By DANIEL DEFOE

Daniel Defoe, who was the real father of English fiction, and whose beautifully clear style of story-telling has never been surpassed by any other English writer, wrote many books; but perhaps his "Journal of the Plague Year" is next in popularity to his immortal "Robinson Crusoe." It is an enthralling account of London during the terrible visitation of the Plague, which carried away many thousands of the city's inhabitants in the year 1665. The book is written from the point of view of an eye-witness, but as Defoe was only six at the time of the Plague, all that he could know of the terrible year would be by hearsay. We have, therefore, to regard the work as a fiction, but no actual historical account gives a truer picture of it than this enthralling story, where the highest literary art has created a fadeless vision of a terrible time. The extract here chosen is one of the most striking, and, although Defoe himself could not have talked with this poor waterman, we are none the less impressed by the feeling of truth in the story.

I TURNED away over the fields from Bow to Bromley, and down to Blackwall, to the stairs which are there for landing or taking water. Here I saw a poor man walking on the bank, or sea-wall, as they call it, by himself. I walked awhile also about, seeing the houses all shut up; at last I fell into some talk, at a distance, with this poor man. First I asked how people did thereabouts. "Alas, sir," says he, "almost desolate, all dead or sick; there are very few families in this part, or in that village," pointing at Poplar, "where half of them are not dead already, and the rest sick." Then he pointing to one house, "They are all dead," said he, "and the house stands open, nobody dares go into it. A poor thief," says he, "ventured in to steal something, but he paid dear for his theft, for he was carried to the churchyard, too, last night." Then he pointed to several other houses. "There," says he, "they are all dead, the man and his wife and five children. There," says he, "they are shut up. You see a watchman at the door"; and so of other houses.

"Why," says I, "what do you here all alone?" "Why," says he, "I am a poor, desolate man; it hath pleased God I am not yet visited, though my family is, and one of my children dead." "How do you mean, then," said I, "that you are not visited?" "Why," says he, "that is my house," pointing to a very little low boarded house, "and there my poor wife and two children live," said he, "if they may be said to live; for my wife and one of the children are visited, but I do not come at them." And with that word I saw the tears run very plentifully down his face; and so they did down mine too, I assure you.

"But," said I, "why do you not come at them? How can you abandon your own flesh and blood?" "Oh, sir," says he, "the Lord forbid; I do not abandon them, I work for them as much as I am able; and, blessed be the Lord, I keep them from want." And with that I observed he lifted up his eyes to heaven with a countenance that presently told me I had happened on a man that was no hypocrite, but a serious, religious, good man; and his ejaculation was an expression of thankfulness that, in such a condition as he was in, he should be able to say his family did not want.

"Well," say I, "honest man, that is a great mercy, as things go now with the poor. But how do you live, then, and how are you kept from the dreadful calamity that is now upon us all?" "Why, sir," says he, "I am a waterman, and there is my boat," says he, "and the boat serves me for a house; I work in it in the day, and I sleep in it in the night, and what I get I lay it down upon that stone," says he, showing me a broad stone on the other side of the street, a good way from his house; "and then," says he, "I halloo and call to them till I make them hear, and they come and fetch it."

"Well, friend," says I, "but how can you get money as a waterman? Does anybody go by water these times?"

"Yes, sir," says he, "in the way I am employed there does. Do you see there," says he, "five ships lie at anchor?" pointing down the river a good way below the town; "and do you see," says he, "eight or ten ships lie at the chain there, and at anchor yonder?" pointing above the town. "All those ships have families on board, of their merchants and owners, and such like, who have locked themselves up, and live on board, close shut in, for fear of the infection; and I tend on them to fetch things for them, carry letters, and do what is absolutely necessary, that they may not be obliged to come on shore; and every night I fasten my boat on board one of the ship's boats, and there I sleep by myself, and, blessed be God, I am preserved hitherto.

"I seldom come on shore here; and I come only now to call my wife and hear how my little family do, and give them a little money which I received last night."

"Poor man," said I; "and how much hast thou gotten for them?"

"I have gotten four shillings," said he, "which is a great sum, as things go now with poor men; but they have given me a bag of bread, too, and a salt fish, and some flesh; so all helps out."

"Well," said I, "and have you given it them yet?"

"No," said he, "but I have called, and my wife has answered that she cannot come out yet, but in half an hour she hopes to come, and I am waiting for her. Poor woman," says he, "she is brought sadly down; she has had a swelling, and it is broke, and I hope she will recover, but I fear the child will die; but it is the Lord!" Here he stopt, and wept very much.

At length, after some further talk, the poor woman opened the door, and called "Robert! Robert!" He answered, and bid her stay a few moments, and he would come; so he ran down the common stairs to his boat, and fetched up a sack in which was the provisions he had brought from the ship; and when he returned he hallooed again. Then he went to the great stone which he showed me, and emptied the sack, and laid all out, everything by themselves, and then retired; and his wife came with a little boy to fetch them away; and he called and said such a captain had sent such a thing, and such a captain such a thing, and at the end adds, "God has sent it all; give thanks to Him." When the poor woman had taken up all, she was so weak she could not carry it at once in, though the weight was not much neither; so she left the biscuit which was in a little bag, and left a little boy to watch it till she came again.

"Well, but," says I to him, "did you leave her the four shillings too, which you said was your week's pay?"

"Yes, yes," says he, "you shall hear her own it." So he calls again, "Rachel! Rachel!" which, it seems, was her name, "did you take up the money?" "Yes," said she. "How much was it?" said he. "Four shillings and a groat," said she. "Well, well," says he, "the Lord keep you all"; and so he turned to go away.

THE CASTLE ON THE CLIFF : By GEORGE MACDONALD

Dr. George Macdonald, the famous Scottish novelist and poet, had also the rarer power of writing the most charming fairy stories. This is not one of his fairy tales, as such tales never have a "moral," but he uses here the style of the fairy story to illustrate a religious lesson. If we read this carefully, and remember that the castle on the cliff is really meant to represent the dwelling-place of the human family, and the absent parent, whose care for his children in the castle is shown in many ways, and who will some day show himself to them, is God the Father, we shall see that "The Castle on the Cliff" is really a story that explains in a little space the religious faith of Christian people.

On the top of a high cliff, forming part of the base of a great mountain, stood a lofty castle. When or how it was built, no man knew; nor could anyone pretend to understand its architecture. Everyone who looked upon it felt that it was lordly and noble.

Now, in this castle there dwelt a large family of brothers and sisters. They had never seen their father or mother. The younger had been educated by the elder, and these by an unseen care or ministration about the sources of which they had, somehow or other, troubled themselves very little, for what people are accustomed to, they regard as coming from nobody; as if help and progress and joy and love were the natural crops of Chaos or old Night.

But Tradition said that one day—it was utterly uncertain *when*—their father would come, and leave them no more;

for he was still alive, though where he lived nobody knew. Now and then the young children would come in with a slow, stately step, and, with great eyes that looked as if they would devour all the creation, say that they had met their father among the trees, and that he had kissed them. "And," added one of them once, "I grew so big!" But when the others went out to look, they could see no one. And some said it must have been the brother, who grew more and more beautiful, and loving and reverend, and who had lost all traces of hardness, so that they wondered they could ever have thought him stern and harsh. But the eldest sister held her peace, and looked up, and her eyes filled with tears. "Who can tell," thought she, "but the little children knew more about it than we?"

Often at sunrise might be heard their hymn of praise to their unseen father, whom they felt to be near, though they saw him not. Some words thereof reached my ear through the folds of music in which they floated, as in an upward snowstorm of sweet sounds. And these are some of the words I heard—but there was much I seemed to hear which I could not understand, and some things which I understood but cannot utter again:

"We thank thee that we have a father, and not a maker; that thou hast begotten us, and not moulded us as images of clay; that we have come forth of thy heart, and have not been fashioned by thy hands. It *must* be so. Only the heart of a father is able to create. We rejoice in it, and bless thee that we know it. We thank thee for thyself. Be what thou art—our root and life, our beginning and end, our all in all. Come home to us. Thou livest; therefore we live. In thy light we see. Thou art—that is all our song."

Thus they worship, and love, and wait. Their hope and expectation grow ever stronger and brighter that one day, ere long, the Father will show himself amongst them, and henceforth dwell in his own house for evermore. What was once an old legend has become the one desire of their hearts. And the loftiest hope is the surest of being fulfilled.

THE CASTLE STOOD ON THE TOP OF A HIGH CLIFF

CONTINUED ON PAGE 5745

CANADIAN MINERAL RESOURCES

For a country possessing nearly half of North America, Canada has been exceedingly slow in developing its mineral resources and until recently many doubted whether Canada would ever become an important mining country. But on account of the increased activity of the past few years, Canadians are beginning to hope that their country will prove as rich as the great republic to the south. Almost all the provinces possess mineral resources of importance but only three, Nova Scotia, British Columbia and Ontario, have been large producers of the products of mines.

GOLD

Gold has been found in all the provinces and territories with the exception of Prince Edward Island. In Nova Scotia, the area of gold bearing rocks is very wide and extends through the roughest part of the province. Quebec produces little gold; for many years the gold-bearing gravels on the Chaudiere River and its tributaries have been slightly worked. Gold is found over an extensive area of Ontario. Over nearly this entire area gold-bearing quartz is found. Gold mining is only in its infancy but it will not be many years before Ontario will be known for its production of this precious metal. Manitoba contains some gold-bearing quartz but the ore is so low grade that little attention has been paid to mining it. Some gold has been washed from the bars of the Saskatchewan river. It is believed that as Alberta is explored gold-bearing rocks will be found.

In the northwest corner of the Dominion is the district of Yukon, extending over an area of 207,076 square miles. The country is a large mining camp. The geological character of the territory is a continuation of that of British Columbia. There is a gold-bearing belt of indefinite width and three hundred miles long and this area is one of the richest gold fields which has ever been discovered.

British Columbia has long been known as a gold mining country. It is the northwest continuation of the great gold and silver bearing belt of the Western States, from which so many hundreds of millions of dollars' worth of the precious metals have been obtained. Gold is found in paying quantities in almost every section of the province and there is scarcely a creek where "colour" cannot be found. The yearly output is about five million dollars.

SILVER

Ontario and British Columbia are the two great silver-producing provinces. For many years some mines had been operated in the Thunder Bay district north of Lake Superior. A few years ago silver was discovered at Cobalt. This town has become the centre of the greatest silver-producing area in the world. When this country has been developed it will place Ontario in the front rank of the world's silver-producing countries.

For many years, British Columbia produced little silver but the discovery of silver-lead ores in the Kootenay district has rapidly increased the yield until it amounts to about three million ounces annually.

LEAD

Lead is found in Ontario and British Columbia but it is only in the latter province that it is mined to any extent. Lead is mined as an ore of silver in which it may be looked upon as a by-product. The output of about fifty million pounds a year will continue to increase with that of silver.

COPPER

British Columbia and Ontario are the important producers of copper. A small amount is mined in Quebec and reports show that the Barren Lands and the country around Hudson Bay

Copyright, 1911, by M. Perry Mills.

possess great quantities of rich copper ore. From British Columbia the first shipment was made in 1894 and the production has increased at a rapid rate until it amounts to upwards of forty million pounds a year. In Ontario the copper-producing district is around Sudbury and along the shores of Lake Superior.

NICKEL

Ontario possesses very rich deposits of nickel. The Sudbury district produces more of the metal than all the rest of the world. The most important fact in connection with the large output is that there is no sign of exhaustion.

IRON

All the provinces except Prince Edward Island possess important deposits of iron. Little mining or smelting is being carried on except in Nova Scotia, Quebec and Ontario. Nova Scotia takes the lead in the production of iron and as yet the industry is only in its infancy. Quebec and Ontario possess large deposits but little in way of development has been done. In British Columbia iron in great quantities has been discovered on the mainland and on Vancouver Island.

MINOR METALS

A considerable number of other metals besides those mentioned are found more or less extensively in Canada but little has been done in the way of mining them. Zinc is found and mined to some extent in Ontario and British Columbia. Cobalt, arsenic and corundum are found in paying quantities in Ontario. Small deposits of manganese and antimony exist in the Maritime Provinces. Some cinnabar is mined in British Columbia.

COAL

Canada has coal cropping out on the shores of the Atlantic, on the shores of the Pacific and underlying large areas of the interior plains. Ontario and Quebec, the two most populous provinces, do not possess coal. Nova Scotia is the largest producer among the provinces and its deposits are practically inexhaustible. New Brunswick has some coal but does not mine sufficient for its own use. The western provinces are richly supplied with coal.

PETROLEUM

Petroleum has been found in many parts of Ontario but the western peninsula is the oil region. The county of Lambton is the seat of the industry but producing wells are found in adjacent counties. Oil has been discovered in small quantities at Gaspe, Quebec, in New Brunswick and Nova Scotia. It is believed that a large area of oil-bearing strata underlies a large part of northern Alberta. In British Columbia there is a large area of oil land.

NATURAL GAS

Along the shores of Lake Erie wells of natural gas are very numerous. The chief regions of production are Essex, Kent and Welland Counties but new localities are being continually found. Large flowing wells have been found in Alberta and British Columbia.

MINOR ECONOMIC MINERALS

Quebec produces a large part of the asbestos marketed in the world. Some valuable deposits have recently been discovered in Ontario and British Columbia. A considerable amount of mica is quarried in Quebec and Ontario. Gypsum is found in many places but the richest beds are in Nova Scotia. A few thousand dollars' worth of graphite is mined in Ontario and Quebec, where apatite is also found in large quantities. Some mineral paint, soapstone, whiting, actinolite and a few precious stones are produced. Large and valuable deposits of salt are found along the shore of Lake Huron.

BUILDING MATERIALS

Almost all parts of Canada are well supplied with suitable clay for brick, cement and tile making. Limestones of the best quality abound in Canada. Quebec possesses very valuable slate quarries, and some granite. Nova Scotia and New Brunswick have extensive and valuable granite deposits.

The three provinces now advancing at a rapid rate in the products of the mine are Ontario, British Columbia and Nova Scotia. The two latter are among the few regions in the world where unlimited supplies of coal and iron are found side by side.

THE MARITIME PROVINCES

Nova Scotia, New Brunswick and Prince Edward Island form a group of provinces on the eastern coast of Canada. They possess many common characteristics and their histories are closely interwoven. Acadia is another name that was formerly applied to this whole region. The descendants of the four thousand Acadians found in the country in 1763 now number a hundred and fifty thousand. They are largely found in certain counties forming real French communities differing in manners and language from near-by English speaking settlements.

NOVA SCOTIA

The province consists of the peninsula of Nova Scotia and the island of Cape Breton. The peninsula is two hundred and sixty-eight miles long and varies in width from sixty to a hundred miles. The island is one hundred and eight miles long, with a very irregular width, and is hollowed out in the centre by a long arm of the sea — the Bras d'Or. Nova Scotia faces the Atlantic Ocean and is connected with New Brunswick by an isthmus which is eleven and a half miles wide at its narrowest point.

The coast is low, rugged and rocky. The western shores are wooded to the water's edge but on the eastern coast there is only a scanty growth of birch and spruce. The Atlantic coast is deeply indented with many excellent harbours, the most prominent being Halifax, easy of access, deep, free from rocks and large enough to contain the navies of the world with plenty of anchorage to spare.

MINERALS

The mineral resources are valuable and it is one of the few countries where coal and iron are found side by side. Nearly all the commercial ores are found, but coal, iron, gypsum and gold are the only ones that are extensively worked. The coal fields at Sydney, Cape Breton, cover an area of two hundred and fifty square miles. The coal deposits of the province are estimated as containing forty billion tons. The iron deposits are extensive but outside of Cape Breton are little worked. The gold fields are valuable and are scattered over the entire province. Gypsum is found in nearly every county but the deposits are only partially worked.

FARMING

The agricultural lands face the inner bays. The valley of Annapolis is celebrated for its apples. In Cumberland, Colchester and Hants Counties are the dyked lands which have produced large crops of hay for the past hundred years. During recent years dairying has been attracting considerable attention.

OTHER INDUSTRIES

The fisheries are among the finest and most profitable in the world. The Atlantic coast waters abound with cod, mackerel, herring, haddock, halibut, and its shores with lobsters and oysters. In the value of her fisheries Nova Scotia is second among the provinces. Over one-third of the province is still covered with valuable forests and lumbering is an important industry. It is only recently that manufacturing has become important.

CITIES AND TOWNS

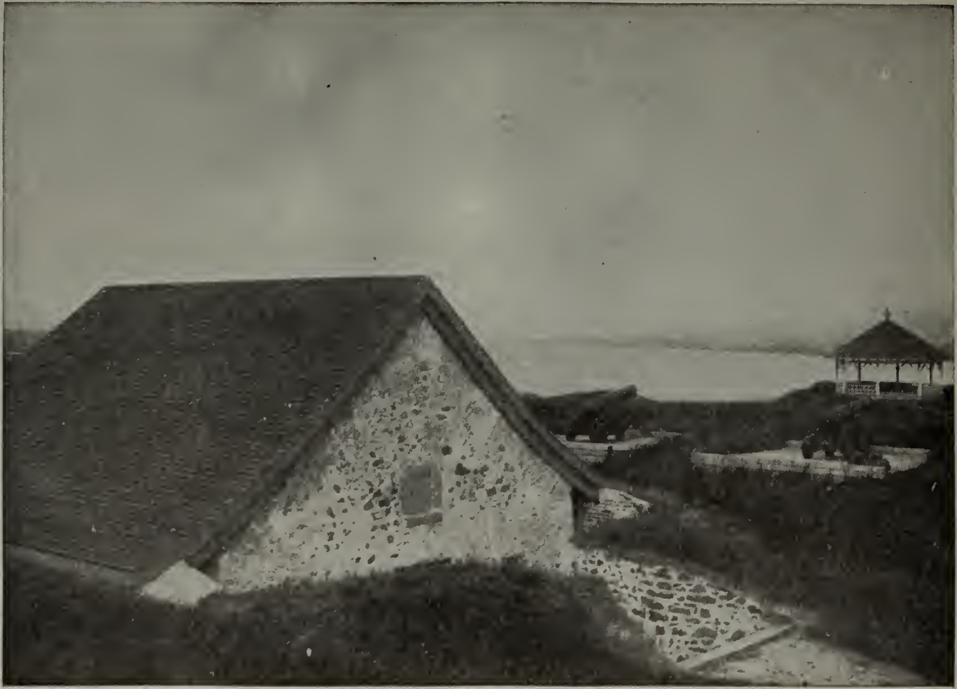
The chief city is Halifax (46,619), the capital of the province. It is very strongly fortified not only by the citadel, a fortress rising over the city, but by forts at the entrance of the harbour and upon islands which command the channels of the approach to the sea. The city has a splendid public school system, a university, electric cars, dry docks and cable communication with Europe. Sydney (17,723), on Cape Breton Island, is becoming an important city. It is the centre of a great coal industry and is rapidly becoming a large manufacturing place. Yarmouth, a shipping point; Truro a railway centre; New Glasgow, a mining town; and Amherst are flourishing and rapidly growing towns.

PRINCE EDWARD ISLAND

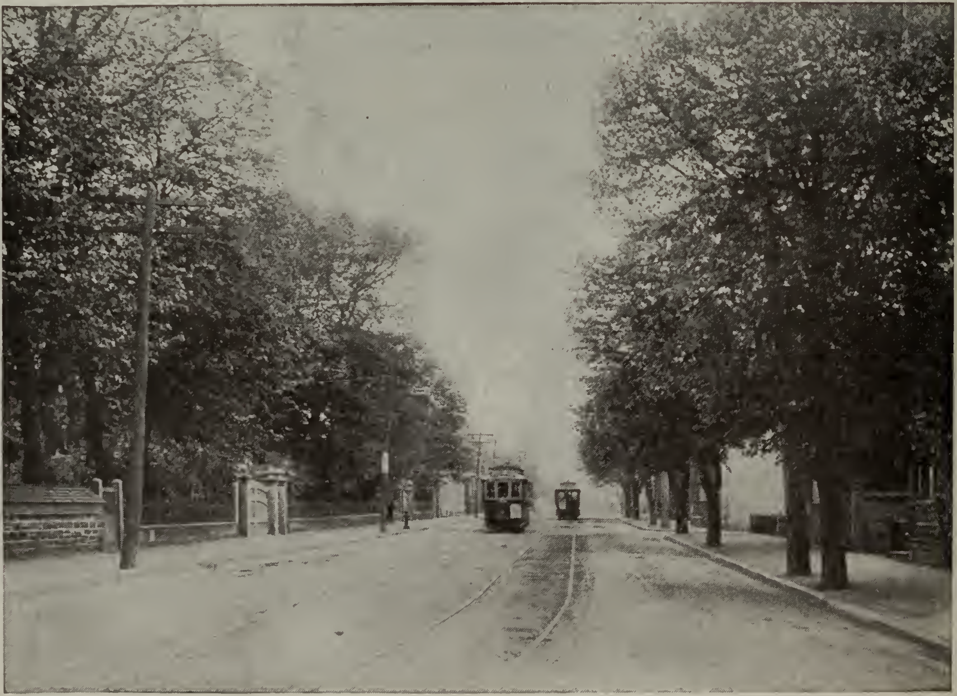
The island lies in the form of a crescent in the Gulf of St. Lawrence and is

Copyright, 1911, by M. Perry Mills.

WHAT NOVA SCOTIA CAN SHOW

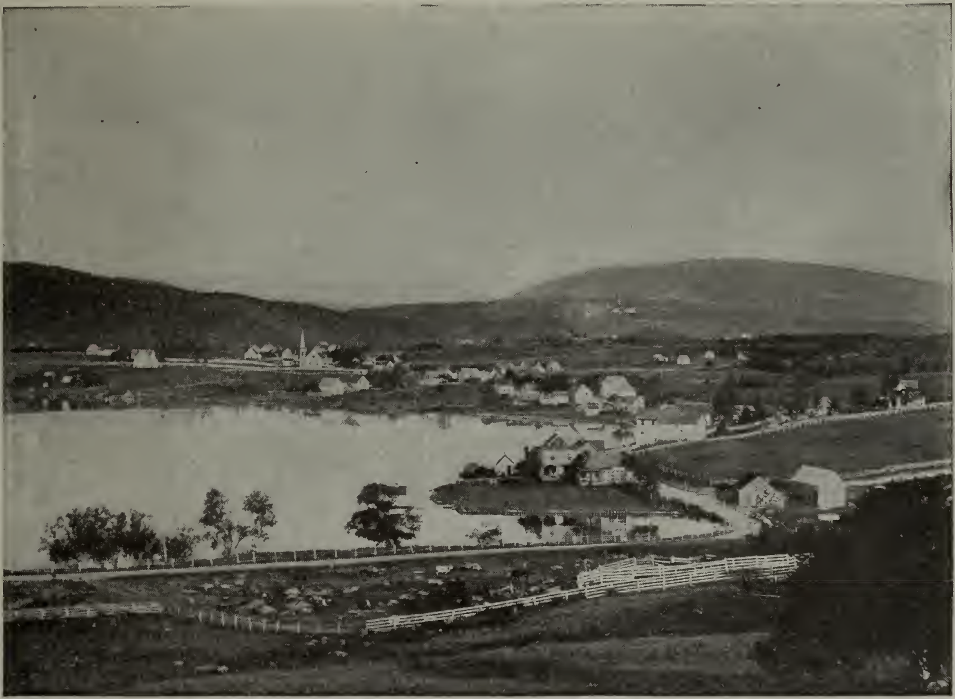


The village of Annapolis Royal was once considered a strong fortress though now a modern warship would knock it to pieces in ten minutes. Here is the old powder magazine and some of the old cannon which were so dangerous a hundred and fifty years ago.

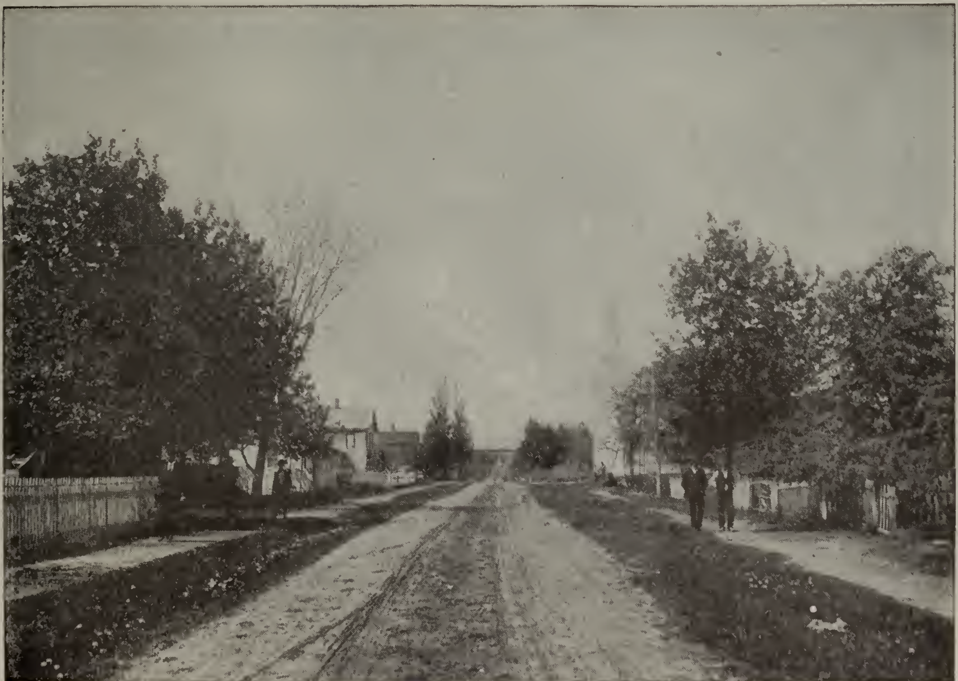


Halifax, Nova Scotia, is one of the old towns of America, and descendants of some of the original settlers still live there. Some of the residential streets, like Spring Garden Road, here shown, are beautiful.

TWO CHARMING CANADIAN VILLAGES



This is the charming little village of Whycocomagh on Cape Breton Island, or rather we should say in the island, for it is in the interior, on an arm of the Bras d'Or Lake. No more beautiful place for a summer vacation can be found.



So much of Canada is busy and new that it is delightful sometimes to find a quaint old village like Kingsport on the Basin of Minas. Here everything moves slowly and quietly along, and the atmosphere is restful when one is tired of the busy city.

separated by the Strait of Northumberland from the shores of New Brunswick and Nova Scotia. It is one hundred and forty-five miles long and varies in width from four to thirty-four miles.

THE "GARDEN OF THE GULF"

The soil is very fertile and the island is dotted with farms. It is known as the "Garden of Canada." About eighty-five per cent of its area is cultivated and the remainder consists of peat bogs and swamps. The dense forests that once covered the island have been cleared away. The two staple crops are oats and potatoes but in recent years considerable attention has been paid to dairying.

Prince Edward Island is regarded as possessing around its coasts the best fishing grounds in the Gulf of St. Lawrence. The tastes of the islanders are more in the direction of agriculture and the fishing industry is not greatly developed. These two industries occupy the large percentage of the people as there is no mining, no lumbering and little or no manufacturing.

The smallest of the provinces of Canada is more thickly populated than any of the others. The capital and chief city is Charlottetown (12,000), situated on the south side of the island.

NEW BRUNSWICK

The province of New Brunswick is almost square in shape, being bounded on the north by the Bay Chaleur and Quebec, on the west by Quebec and Maine, on the south by Bay of Fundy and the small isthmus at its head and on the east by the Gulf of St. Lawrence. The extreme distance from east to west is two hundred miles and from north to south two hundred and thirty miles.

The southern border fronting on the Bay of Fundy is protected from the tides by a series of low mountain ridges. These extend to the southwest corner of the province and from there run at an angle of forty-five degrees to Bathurst on the Bay Chaleur.

The province depends largely upon the products of the forest and the sea. The valuable pine has been almost exhausted but large areas of hardwood remain. Spruce is the staple tree and there are millions of acres of the finest spruce forests. During the past few years several large pulp wood mills have been erected and the making of pulp wood is becoming an important industry. The fisheries are extensive and productive.

Since the exhaustion of the deposit of albertite, New Brunswick has not developed any important mining interests. The area of coal land is large but coal mining does not pay as the seams are thin. Iron, manganese, antimony, copper and plumbago abound but no exports occur. Gold and silver in paying quantities are found in many places. Gypsum occurs in unlimited quantities and considerable is exported yearly. Valuable quarries of granite, grindstone and limestone are quite extensively worked.

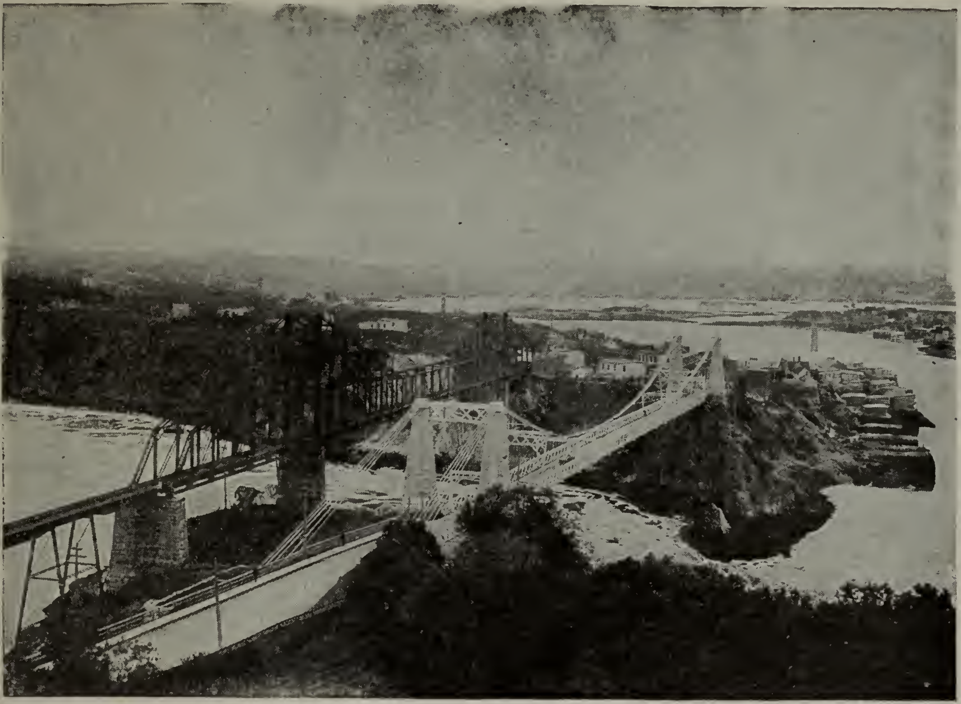
It is only recently that the agricultural resources are beginning to be developed as formerly the people turned their energies to lumbering and fishing. Along the valleys of the rivers and on the marsh lands at the head of the Bay of Fundy are large tracts of very rich farming land. The whole central area is suitable for agriculture. Everything may be grown that will grow in a temperate climate. In the southwest there are many sections of fine farms but only a small part of the fourteen million acres of arable land is under cultivation. During the last few years considerable attention has been paid to dairying and many new industries have been developed, such as the manufacture of cotton, boots, furniture, iron products, leather and wood pulp.

TOWNS

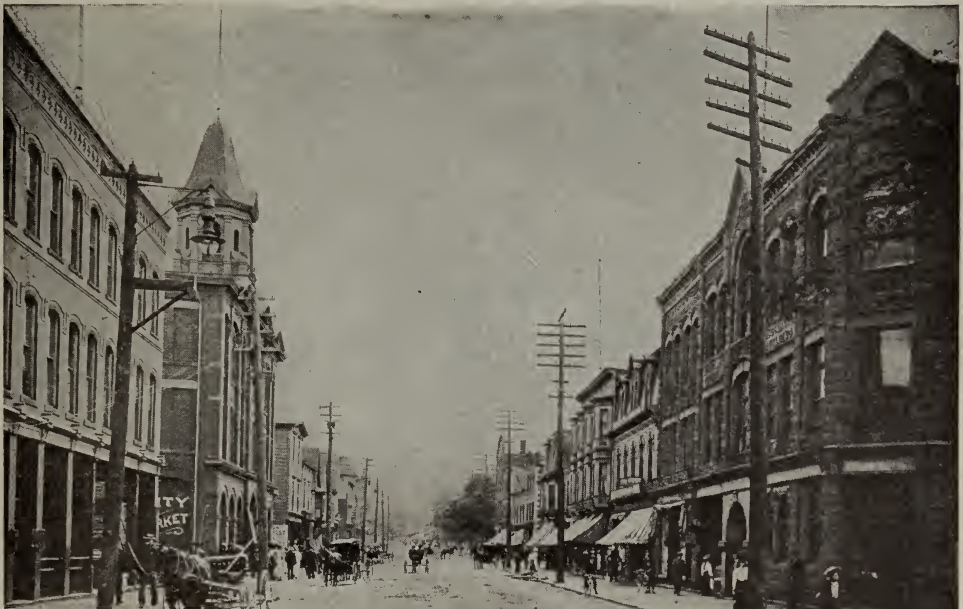
The chief city is St. John (42,511), situated on a fine harbour at the mouth of the river of the same name. It is a great shipping centre and recently has become noted for its manufactures. Moncton (11,345), a railroad and a manufacturing centre, is the second city.

The wonderful mineral wealth, the large harbours, the great areas of fertile soil, the extensive fisheries, the great water power, all indicate that these eastern provinces are destined to a great increase in wealth, trade and population during the twentieth century.

TWO PROSPEROUS CANADIAN CITIES



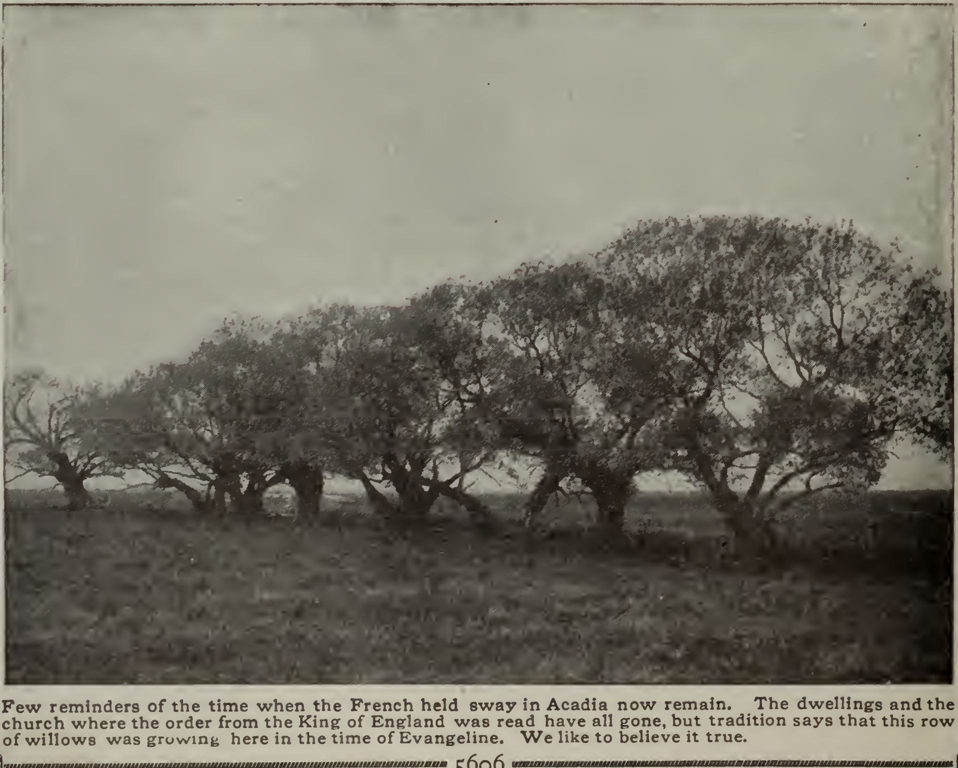
St. John, New Brunswick, on the St. John River, was largely settled by loyalists who left America at the time of the Revolution. It is a busy city in a beautiful situation. Though partly destroyed by fire in 1877, the inhabitants were not discouraged. Its industries and manufactures are valuable.



Moncton, New Brunswick, has little in common with the sleepy villages we have shown you on other pages. It is a busy, bustling city which is growing in population and wealth.

IN BEAUTIFUL EVANGELINE LAND

Cape Blomidon is referred to in Longfellow's poem, Evangeline, describing the British ejection of the Acadians in 1755. Here it is standing out in the beautiful Basin of Minas, that wonderful bay where the tides rise so high. Every year thousands of travellers visit this delightful country.



Few reminders of the time when the French held sway in Acadia now remain. The dwellings and the church where the order from the King of England was read have all gone, but tradition says that this row of willows was growing here in the time of Evangeline. We like to believe it true.

THE CANADIAN ROCKIES AND BEYOND

The Canadian Rockies are a continuation of the United States chain of the Rocky Mountains. The boundary line between British Columbia and Alberta follows the summits of the range as far as fifty-four degrees north latitude, whence the Rocky Mountains continue in a northwest direction in British Columbia.

MOUNTAIN PEAKS

The average height along the American boundary is eight thousand feet but the climax is reached between fifty and fifty-two degrees north latitude. Here the Saskatchewan and the Athabasca Rivers take their rise in the glaciers of the loftiest valleys of the range. Several peaks along the boundary reach ten thousand feet in height, but the highest of them are Mount Logan (19,939 feet), Mount Vancouver (15,617 feet), and Mount Hubbard (16,400 feet).

There are many well-known passes over the mountains of which the most important are the Boundary (7100 feet), the Crow's Nest (5,500 feet), the Kicking-horse (5,300 feet), through which passes the Canadian Pacific Railway, and Peace River (2,000 feet), through which flows the river of the same name.

The Rocky Mountains are correctly named as the summits are massive edges of broken limestone bare of soil and covered with perpetual snow. The effect of their great height is diminished on the eastern side by the rise of the foot-hills and the height of the passes. It is only on descending into the western valley that the full height is appreciated. The western slopes are the more densely wooded. On the eastern side the slopes are partly covered with trees, partly grassy prairies and partly barren rock. The mountains contain billions of tons of the finest bituminous and anthracite coal.

Frequently whole mountain ridges are formed of massive limestone strata uplifted and upturned on edges. Thus the mountains present to the traveller from the east abrupt and serrated outlines against the sky, revealing by the acute summit peaks their recent geologic age. The width at the American boundary is about sixty miles, but it gradually grows less as they go northward.

THE SELKIRKS

Parallel to and west of the Rocky Mountains and frequently included under one name with them though of distinct formation run the Selkirks. This range which has been shown by geologists to represent an earlier upheaval and to exhibit an entirely different series of rocks, is so broken and complex as to have received several names in different parts of its course. Entering from the south in a three-fold system and divided by important valleys, they are called respectively the Purcell, the Selkirk, and the Gold Mountains. To the north of the great bend of the Columbia River these give place to the term Caribou Mountains. These ranges are the chief sources of the gold and silver found in the province. They do not rise much higher than ten thousand feet; the highest peaks are Mount Sir Donald (10,645 feet), Mount Macdonald (9,440 feet) and Mount Tupper (9,030 feet), all in the Central or Selkirk Range. Many abrupt peaks are found but the general character of the whole chain is less serrated than the Rockies.

THE COAST RANGE

Descending from the Gold Range, a great plateau intervenes for a distance of one hundred miles until the Coast Range, the great western rim of the mainland, rises on the ocean margin with a width of a hundred miles. This is often inaccurately called the Cascade Range, but geologists have shown that the Cascade Range of the United States is essentially different both in composition and geologic age and that the Coast Range is a distinct system and consists chiefly of crystalline rocks. It attains a height of seven thousand feet and abuts on the shore in many places in spurs which, rising almost out of the sea on the borders of fiords, show the full measure of the height to the observer. This range is very rugged and on the

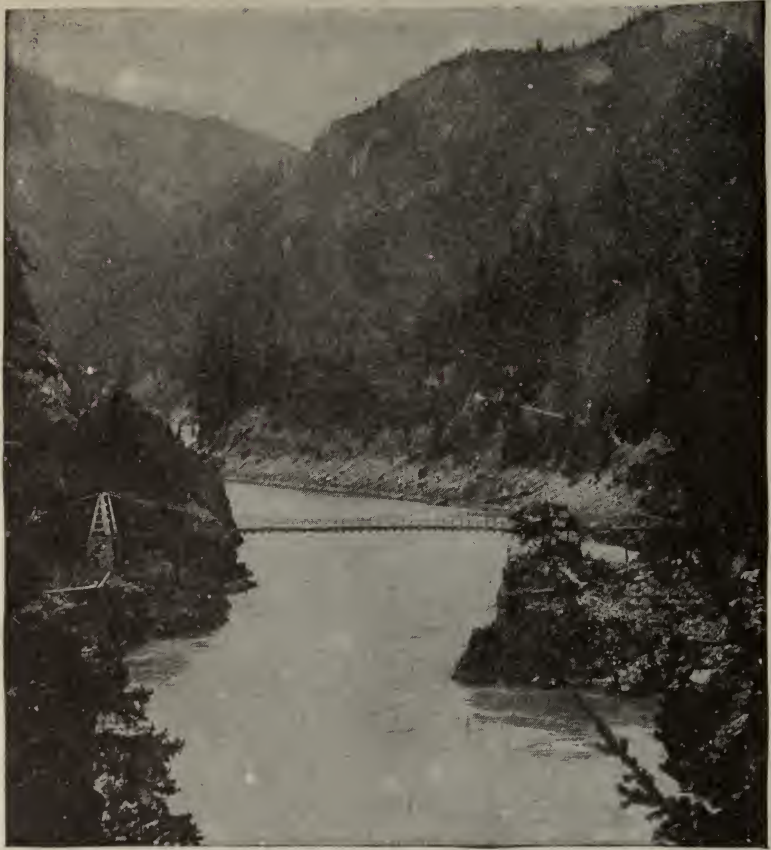
TWO GEMS OF THE ROCKIES

Among the Rocky Mountains are some beautiful sheets of water. Lake Louise, the "Lake in the Clouds," is surpassed in beauty by none of the famous lakes of which poets have sung in the past. The snow-covered mountains with the forests around their bases shut it in on all sides.

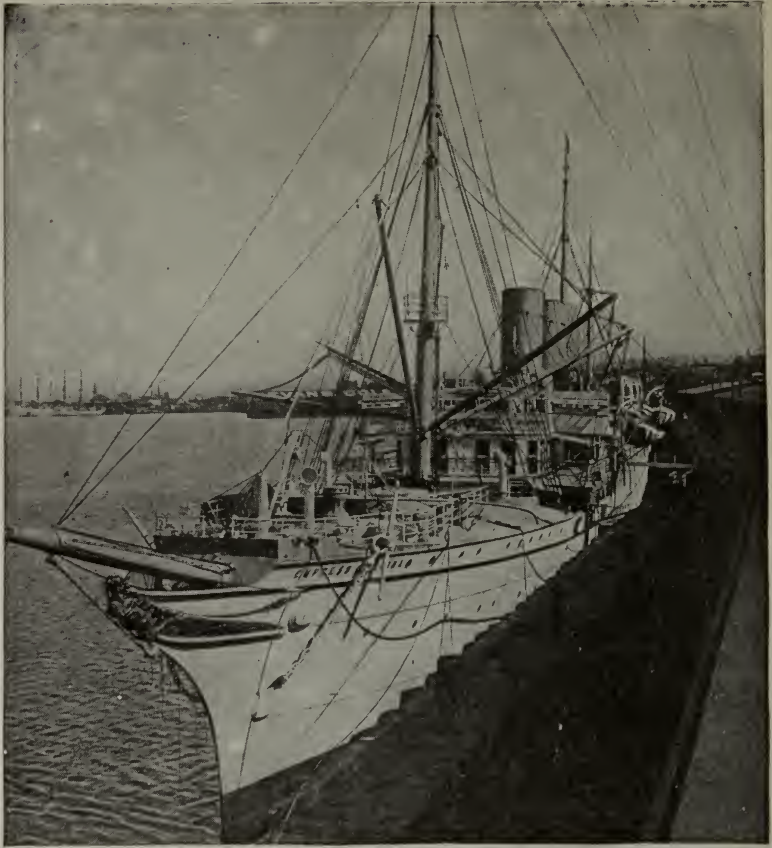
Pictures copyright, 1906, by H. C. White Co.

Not far from Field, British Columbia, is Emerald Lake, which some consider even more beautiful than Lake Louise. The enterprise of the railway company has built great hotels along the route, in which one may live in comfort while feasting the eyes upon the wonderful works of Nature.

MOUNTAIN AND SEA IN THE CANADIAN WEST



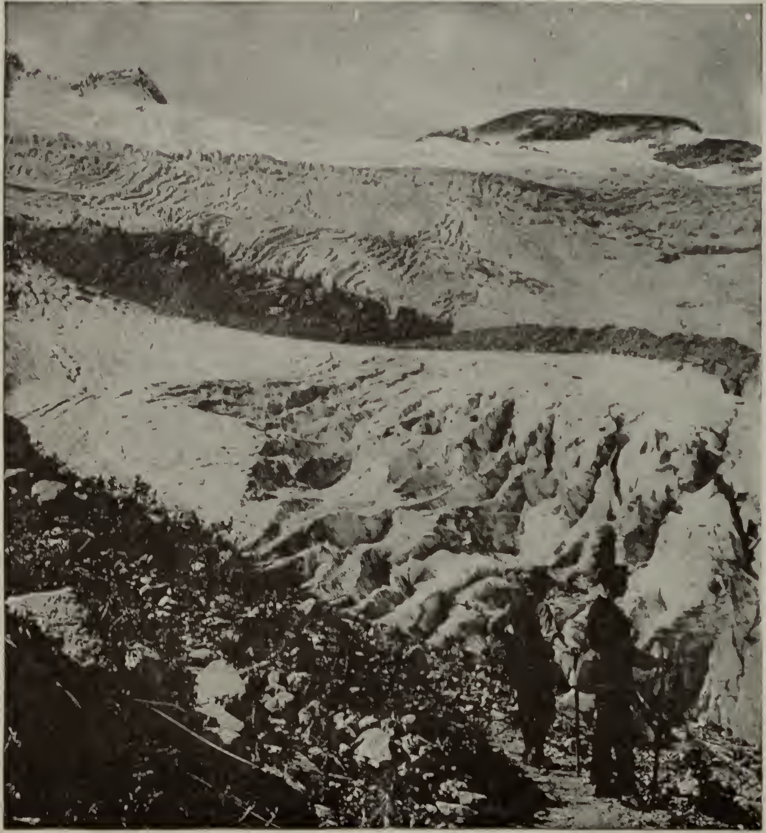
The Fraser River in British Columbia is rugged and swift for the greater part of its length, as it winds and twists along the way it has cut through the mountains. This graceful suspension bridge which seems hardly able to bear the weight of a doll is called Caribou bridge and is strong enough for heavy traffic



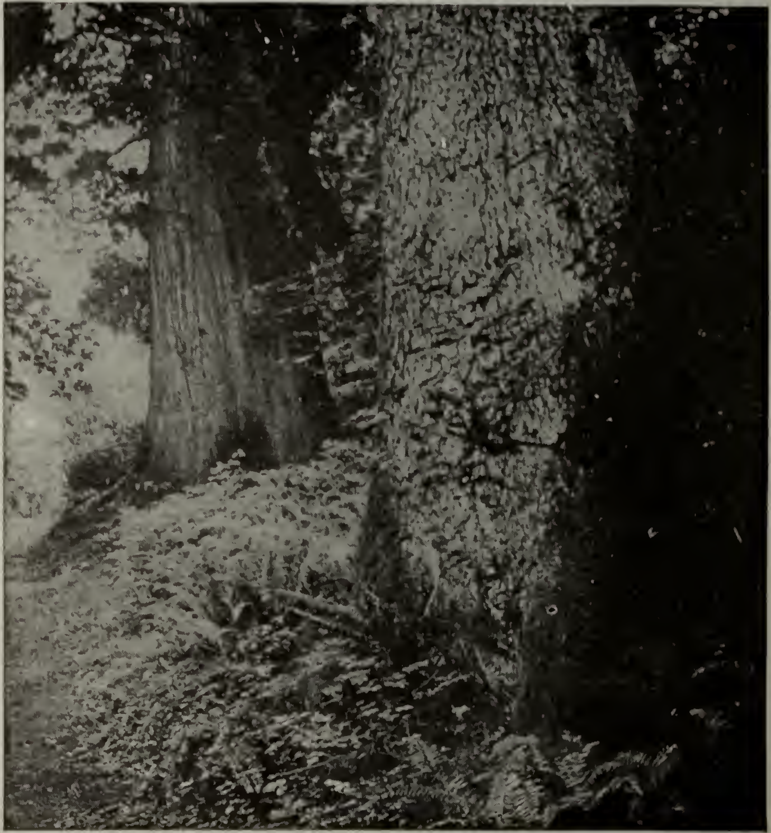
Vancouver is rapidly becoming one of the important ports of the world. From its wharves steamers go to every part of the world. This is the steamship Empress of China, built for trade with the Far East, where one can transfer to another ship under the British flag for the journey to Europe.

Pictures copyright by H. C. White Co.

ICEFIELDS AND FORESTS IN BRITISH COLUMBIA



In another part of our book you were told of glaciers, those great rivers of ice which slowly flow down from the mountains to the lowlands. Here is the great Asulkan Glacier, on the Selkirk Range in British Columbia. Crossing a glacier is dangerous as besides the slippery footing underneath, there are great cracks into which the traveller may fall.



The lumber interests of British Columbia are very important. Near the city of Vancouver is Stanley Park, in which grow some of the finest trees in America. The climate is mild and moist and vegetation grows with almost tropical luxuriance. The ferns you see are very tall, though because of the size of the tree you do not realise their height.

Pictures copyright by H. C. White Co.

western side is heavily timbered. The Coast Range has a parallel mountain chain in the partially submerged Island Range which is represented by an archipelago of islands great and small, the most prominent being Vancouver and Queen Charlotte Islands.

SCENERY

No better view of the mountains can be obtained than by following the Canadian Pacific Railroad in its course through Kicking-horse Pass and on through the various ranges to the city of Vancouver. After following a stretch of rolling prairies the road winds for some distance through the foot-hills before it reaches Banff and then plunges into the fastnesses of the Rockies.

Banff, the gateway to the Canadian National Park, is noted as a tourist resort. The scenery in the vicinity is beyond description. Mountain peak rises above mountain peak, while rushing waters and lakes give colour to the scene. Then for several hundred miles a continuous panorama of bewildering magnificence is presented which no pen can well describe. Everywhere steep forest-clad slopes rising through lofty glaciers are capped with perpetual snow. Lakes with water as clear as crystal and walled in by tremendous cliffs relieve the scene. Mighty waterfalls and cataracts of wonderful beauty din the air with their loud clamour. The marvellous grandeur is enriched by little lakes literally nestling amid the clouds and encircled by majestic peaks. Glaciers, palisades of hanging snow set amid surroundings of wild Alpine grandeur add to the enchanting array. Nothing in Switzerland is more beautiful than the glaciers of the Canadian Rockies and the Selkirks. Through still more wondrous glacial fields, startling precipices, snow-capped peaks, wide forest areas with gigantic firs and cedars, rushing waterfalls, mountain streams, rivers and lakes, one is not aroused from the enchanting scene until Vancouver, the western terminus of the Canadian Pacific Railway, is reached.

VANCOUVER

Vancouver (100,000) is beautifully situated on the shores of Burrard Inlet, one of the deep fiords of the coast. The Inlet is a half mile wide at its mouth and opens out to two miles in front of the city. It makes Vancouver harbour, land-locked, sheltered from all points, roomy, deep enough for the largest vessels, open all winter, the finest harbour in the world. This infant city, the child of the Canadian Pacific Railway, does not appear in the census of 1881 for it was then the site only of giant firs and cedars. In 1891, the population reached fourteen thousand, and this year has passed the hundred thousand mark.

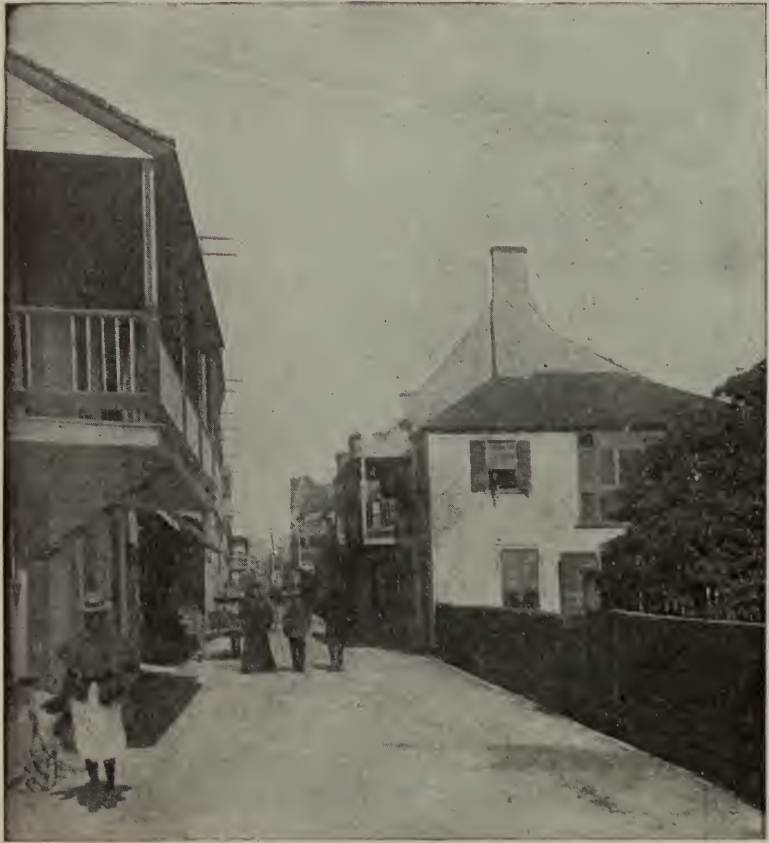
Vancouver is a thriving, progressive city full to overflowing with wonderful vim and enterprise. The public buildings, business blocks, churches, schools, libraries and clubs are equal to those of the older cities in the East. The city has connections by land and sea with all important points on the coast and in the interior. Vancouver has a very complete electric railway system and a sewerage system constructed on modern lines.

VICTORIA

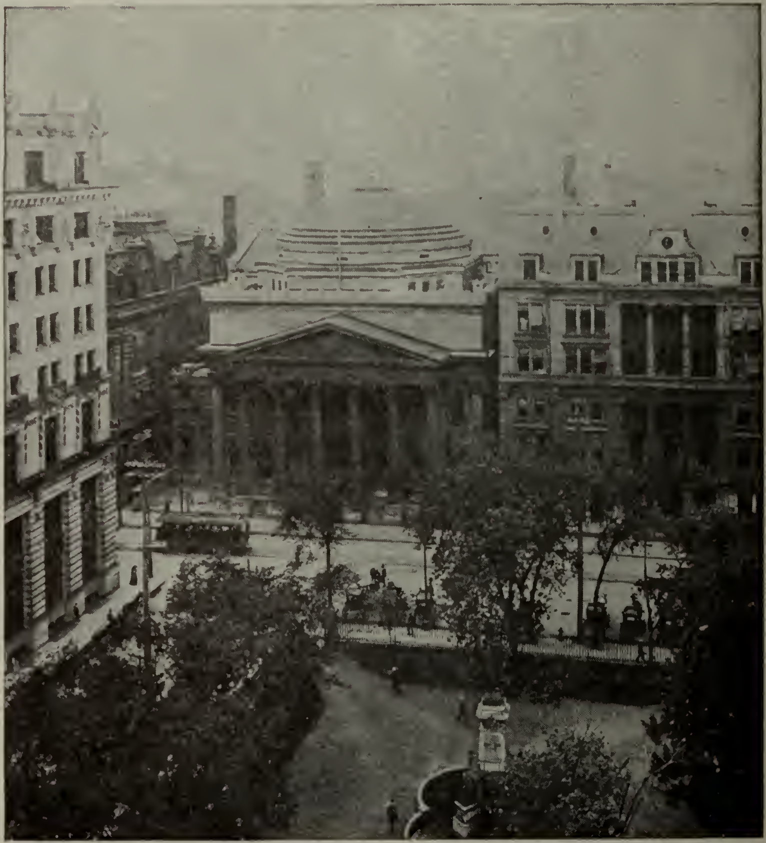
Victoria (31,660), the capital of British Columbia, is a beautiful city situated on the southeast corner of Vancouver Island. The city is the oldest in the province, dating back to 1846, when it was known as Camosun, a Hudson's Bay Company's trading post. There is none of the bustle and enterprise of Vancouver and it reminds one of the quiet restful places in some parts of the East. The city loses much in a commercial and business way by not being on the mainland. With its wide, quiet streets, private residences surrounded by small parks, its large number of wealthy Englishmen, retired military and naval officers, Victoria has nothing in common with the average western city.

British Columbia, the Switzerland of America with its enchanting scenery, is becoming a favourite resort for tourists. Scenery is not all, but these picturesque mountains with their untold wealth of minerals and forests may make the province the wealthiest of the Dominion. This is saying much, for some of the other provinces will soon count their population by the millions, instead of by the hundred thousand as at present.

TWO FAMOUS OLD CITIES OF NORTH AMERICA



The first city founded in the United States was St. Augustine, where Spaniards settled in 1565. This is one of the quaint old streets, which seems to belong to another world and another time.



Here is another view of the famous old city of Montreal, which to the people of the United States seems more wonderful than any of their own cities. The building in the centre is the Bank of Montreal.

Pictures copyright by H. C. White Co.

A CHILDREN'S POEM BY THACKERAY

IT is as a great author of fiction and romance that we all know Thackeray, some of whose famous stories have been retold in the "Child's Story of Famous Books." He was also a writer of poetry, chiefly of a lively and humorous kind, of which an example is given in the poem "A Tragic Story;" but no writer has excelled him in the power to invest common objects of everyday life with the interest that arises from sentiment and affection. In the poem which we give here we have an admirable example of his power in this direction. It is touched with true human feeling, and although cane-bottomed chairs are now rather out of fashion, the sentiment attaching to any old chair, in which we recall the presence of some departed loved one, will never go out of fashion. The poet's mention of "rich Latakie" in the seventh verse refers to the kind of tobacco he was supposed to be smoking in his snug little room high up in a London dwelling.

THE CANE-BOTTOMED CHAIR

CONTINUED FROM 5492

IN tattered old slippers that toast at the bars,
And a ragged old jacket perfumed with cigars,
Away from the world, and its toils and its cares,
I've a snug little kingdom up four pair of stairs.

To mount to this realm is a toil, to be sure,
But the fire there is bright, and the air rather pure ;
And the view I behold on a sunshiny day
Is grand through the chimney-pots over the way.

The snug little chamber is crammed in all nooks
With worthless old knicknacks and silly old books,
And foolish old odds, and foolish old ends,
Cracked bargains from brokers, cheap keepsakes from friends.

Old armour, prints, pictures, pipes, china, all cracked,
Old rickety tables and chairs broken-backed ;
A twopenny treasury, wondrous to see.
What matter ? 'tis pleasant to you, friend, and me.

No better divan need the Sultan require
Than the creaking old sofa that basks by the fire ;
And 'tis wonderful, surely, what music you get
From the rickety, ramshackle, wheezy spinet.

That praying-rug came from a Turcoman's camp ;
By Tiber once twinkled that brazen old [lamp ;
A Mameluke fierce yonder dagger has drawn,
'Tis a murderous knife to toast muffins [upon.

Long, long, thro' the hours, and the night, and the chimes,
Here we talk of old books, and old friends, and old times,
As we sit in a fog made of rich Latakie,
This chamber is pleasant to you, friend, and [me.

But of all the old sweet treasures that garnish my nest,
There's one that I love and I cherish the best ;
For the finest of couches that's padded with hair
I never would change thee, my cane-bottomed chair.

'Tis a bandy-legged, high-shouldered, worm-eaten seat,
With a creaking old back and twisted old [feet ;
But, since the fair morning when Fanny sat there,
I bless thee, and love thee, my cane-bottomed chair.

If chairs have but feeling in holding such charms,
A thrill must have passed thro' your withered old arms ;
I looked, and I longed, and I wished in despair ;
I wished myself turned to a cane-bottomed chair.

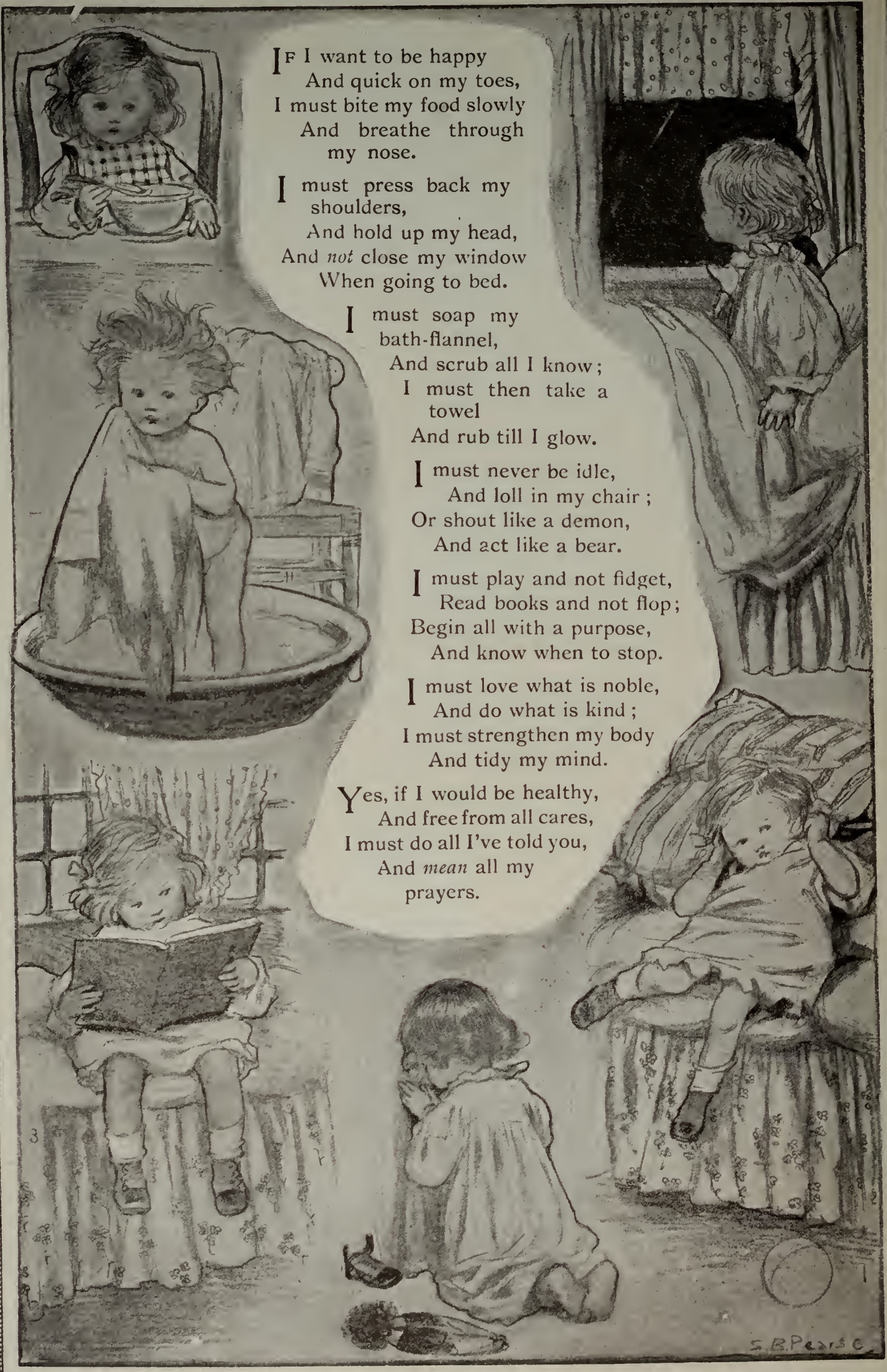
It was but a moment she sat in this place ;
She'd a scarf on her neck and a smile on her face ;
A smile on her face, and a rose in her hair,
And she sat there and bloomed in my cane-bottomed chair.

And so I have valued my chair ever since,
Like the shrine of a saint, or the throne of a prince ;
Saint Fanny, my patroness, sweet I declare,
The queen of my heart and my cane-bottomed chair.

When candles burn low and the company is gone,
In the silence of night as I sit here alone—
I sit alone, but we yet are a pair ;
My Fanny I see in my cane-bottomed chair.

She comes from the past and revisits my room ;
She looks as she then did, all beauty and bloom ;
So smiling and tender, so fresh and so fair,
And yonder she sits in my cane-bottomed chair.

WHAT EVERY WISE CHILD SHOULD DO



If I want to be happy
And quick on my toes,
I must bite my food slowly
And breathe through my nose.

I must press back my shoulders,
And hold up my head,
And *not* close my window
When going to bed.

I must soap my bath-flannel,
And scrub all I know;
I must then take a towel
And rub till I glow.

I must never be idle,
And loll in my chair;
Or shout like a demon,
And act like a bear.

I must play and not fidget,
Read books and not flop;
Begin all with a purpose,
And know when to stop.

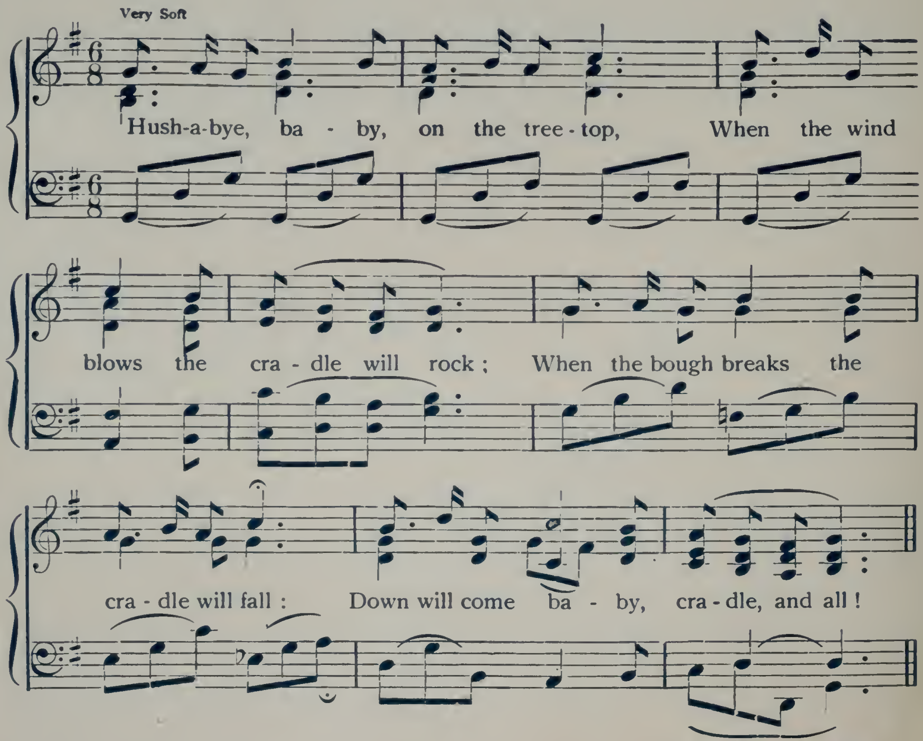
I must love what is noble,
And do what is kind;
I must strengthen my body
And tidy my mind.

Yes, if I would be healthy,
And free from all cares,
I must do all I've told you,
And *mean* all my prayers.

The Lion and the Unicorn
Were fighting for the Crown;
The Lion beat the Unicorn
All round about the town.

Some gave them white bread,
And some gave them brown;
Some gave them plum cake,
And sent them out of town.

Hush-a-bye Baby on the Tree Top


Very Soft
Hush-a-bye, ba - by, on the tree-top, When the wind
blows the cra - dle will rock; When the bough breaks the
cra - dle will fall: Down will come ba - by, cra - dle, and all!

CONTINUED FROM PAGE 5512.

A WEDDING IN THE HILLS OF SCOTLAND DURING THE PERSECUTION OF THE COVENANTERS

BRAVE GRIZEL HUME

THE GIRL WHO WENT OUT BY NIGHT

We may search all history without finding a more charming story of heroism and devotion than that of Grizel Hume. Most of us might hope to be heroes or heroines for the time being in some desperate situation, but Grizel was a heroine all her life. She was born at Redbraes Castle, Berwickshire, on Christmas Day, 1665, and was the daughter of Sir Patrick Hume, or Home; we are not certain now about the spelling. There were eighteen children in the family—and all of them, save two, were younger than herself. She, however, was the special favourite of her father. She showed such extraordinary intelligence that he entrusted her, when she was quite a tiny girl, with secrets which involved his very life, as well as the fortunes of his family.

For we must remember that at this time Scotland, and a great part of England, were greatly excited over what is known as the Covenant. After the Reformation, religious men in Scotland bound themselves by this Covenant to do all in their power to oppose the Pope, and to foster and extend the Protestant faith. When Scotland joined England against Charles I., the Covenant was agreed to by both nations; and when Charles II., after his banishment, was allowed to go back into England to take the throne, he signed the Covenant on landing, and signed it again on being crowned. As soon as he had gained the throne, however, this dishonest king declared the Covenant illegal, and forbade people, on pain of death, to be bound by it. The result was practically civil war. Soldiers were sent to put down the Covenanters. They hunted and killed them with great cruelty, and Scotland became a land of blood and tears.

Grizel's father held to the Covenant, and was several times imprisoned as the result. When Grizel was only ten years old she knew all that was happening. She was filled with sympathy for the persecuted Covenanters, and burned with wrath against the cruel soldiers. At twelve years of age she was called upon to play her first heroic part in life.

A splendid character named Robert Baillie, a bold Covenanter, had been cast into Edinburgh Prison. He had made the mildest attempt to obtain justice for a Covenanting minister who had been wrongfully arrested through the false charges of a scoundrel. The authorities did not bother about the minister; all they wanted was to get hold of Baillie. They threw him into prison, and detained him for a long time. Eventually, after many pretended trials. they took him, one day, to court in his night-clothes, when he was at death's door, tried him, and sentenced him to be hanged and quartered. And the shameful sentence was carried out upon the dying man. That, however, happened after the date at which our story opens.

At the time that we first meet little Grizel, Baillie was in prison, and it was necessary for Sir Patrick Hume to communicate with him. Sir Patrick dared not go himself, or the soldiers would have seized him as well. So brave little Grizel, this child of twelve, went in her father's place. Seeing a gaoler going into the prison, she popped in behind him and hid herself in the shadow of the cell until he had gone, then came forth into the middle of the cell and delivered the message which her father had given her.

In the cell with the poor prisoner there was a little boy—George Baillie, the prisoner's son. How he admired the bravery and skill of the little girl in eluding the gaoler and getting into the prison! She, on her part, admired the little boy, who was there sharing the misery of the cell with his father.

Grizel managed somehow to get safely out of the prison and to make her way back from Edinburgh to her father's home, taking the message which the prisoner had given her.

Having executed Baillie, the authorities now thirsted for the life of the valiant Sir Patrick; and about a year after the death of Baillie, the Humes heard that the soldiers were on their way to Redbraes Castle. To be captured would mean death, but how was he to escape capture? It was certain that he could not hide in or near the castle, for the soldiers would search every nook and cranny. Sir Patrick, his wife, and Grizel, and a carpenter named Winter put their heads together, formed a plan and decided on a hiding-place. They dared not let the other children or servants know it, for fear the soldiers should get the secret out of them.

Winter and Grizel went at dead of night to Polwarth Church, which was a mile and a half from the castle. There they carried a bed and bedclothes, and made a hiding-place for Sir Patrick in the family grave of the Humes in the church. In that resting-place of the dead, the living man was to take up his abode. He went as soon as the retreat was prepared, and when the soldiers arrived at the castle not a trace of him could they find. They could only believe that he had fled from the neighbourhood. Meanwhile Grizel's father was safe in the church vaults, but he had to be fed. He could not return to the castle, for the soldiers lingered in the neighbourhood; but where he was he might as well be dead, so helpless was he. Brave Grizel was equal to this difficulty also.

Night after night she carried food to her fugitive father. The task of getting this food was in itself very hazardous. It would not have done to take it from the larder, for the servants would have missed it, and have had their suspicions aroused. The only way was for poor Grizel to smuggle the food off her plate, and into her lap, as she sat at meals. That was her method, and once she was nearly discovered. Her mother gave her a very bountiful plateful, and presently one of her brothers, looking at her plate, noticed that practically the whole supply had disappeared, and called the attention of the others to what he thought was Grizel's greediness in eating so much with such speed.

But the smuggling of the food to her father was not Grizel's chief difficulty. Every night, at twelve o'clock, she used to set off to walk the lonely mile and a half to the church. Of course, she had to go alone. That in itself was a terrible trial for the nerves of a young girl. The thought of passing through a graveyard at that hour of night would have sufficed to scare most people. But, in addition, Grizel ran the danger of discovery by the soldiers who were in the neighbourhood, and of meeting country people out poaching, who would have followed and spied upon her. Then there were dogs at large to bark at her and increase her terrors. But she smothered all her fears, and, night by night, went bravely on her way to feed her father, to stay and talk for some time with him, to cheer him with such news as she could tell him, and to inspire him with courage to bear his dreadful captivity.

At last Grizel thought it would be safe for her father to return to a hiding-place in the castle. So she and Winter dug a great hole in the basement of the castle. They were afraid to use a spade lest the noise should be heard; so they used their finger-nails for the work. Early every morning they would take up, in a cloth, the soil which they had

GRIZEL HUME IN THE PRISON AT EDINBURGH

The brave little Grizel hid herself in the shadow of the cell until the gaoler had gone. Then she came forth to give her father's message to the prisoner. How the prisoner's son, who was in the cell, admired the brave girl!

dug out during the night, and empty it away in the garden, and then cover over the hole so that nobody should find it. At last the hole was made of sufficient size to admit a sort of big box. In this they placed bed and bedding, and then, one night, Sir Patrick crept home and hid himself in the new sanctuary. For a week this refuge held good, but water drained into the hole and made it impossible for Sir Patrick to remain, so he now determined to flee abroad for safety.

Grizel altered his clothes to make them like the clothes of a peasant, and, when news came to the house that the soldiers were again on the hunt for him, he set out. After many dangers he made his way to London, and, giving his name as Dr. Wallace, got a passage on board a ship which took him to the Continent. His estates were now declared forfeit to the Crown, and the family were left without means. Grizel and her mother went boldly to London and pleaded for support, and eventually they were granted $750 a year out of the estate.

Sir Patrick was not idle in the meantime. He joined with others in an invasion of Scotland, but this was defeated, and he had to retire to Ireland, accompanied by his wife and all the children but one, a daughter who was left in Scotland. But the others could not rest without her, so off to Scotland went Grizel, alone into all the dangers of that unhappy country. She rescued her sister, collected some money owing to her father, and then set out to Holland, where the others had gone in advance. After a journey of many perils she joined them, and for nearly four years the family lived in Holland. Grizel was the little mother of the family. She relieved her mother of the cares of the household, and, when she had any time to spare, she studied music and languages and wrote quite charming poetry. The family were very poor, of course, but with such a girl to inspire them, how could they help being happy? Grizel used to say that those years of poverty were the happiest of her life.

She had by this time grown into a beautiful and accomplished young woman, and more than one handsome young man sought her hand. But little George Baillie had, by this time, developed into a handsome, brave young fellow, and, an exile from home, was serving in Holland in the Guards of the Prince of Orange. The friendship begun in childhood between himself and Grizel had ripened, and, poor as they were, the two loved and hoped.

At last their reward came. The Prince of Orange entered England with an army, and the wretched King James II., who had succeeded to the throne at the death of his brother, Charles II., was driven from the land. Then those good and brave men who had suffered in the evil days were restored to their estates. The Princess of Orange so admired Grizel that she wished to make her a Maid of Honour, and always have her at Court.

But Grizel preferred to return to Scotland with her father, who was now created Earl of Marchmont, and made Lord Chancellor of Scotland. Grizel, as an earl's daughter, now became Lady Grizel Hume. But she was not long to be known by that name. George Baillie had returned to Scotland, and the sweethearts were at last able to be married, fifteen years after they had first met, as boy and girl, in a prison cell.

THE MAN WHO LOVED THE HOUSE

HE had a poor little name—William Twopeny—but in other ways he was rich. In 1797, when he was born at Rochester, many great artists were at work in England; and Nelson, always ready to save his country from Napoleon, was soon to win the great battle of the Nile, August 1, 1798.

When Twopeny was eight years old, in 1805, Trafalgar was fought and won, and Nelson, in his last words to his sorrowing officers, said: "Thank God, I have done my duty!"

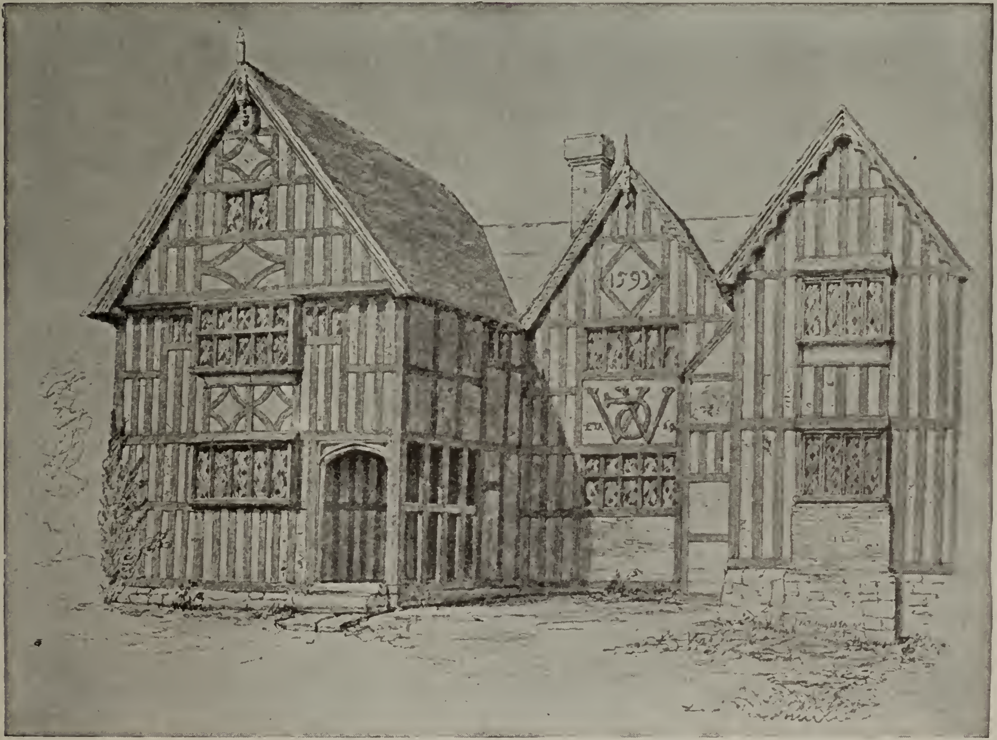
Then Wellington took up the burden of England's fight for life; and Twopeny was eighteen when peace and safety were gained at last on the stricken field of Waterloo, June 18, 1815, at sunset. Think of those times, read about them, and you will see that it was a noble education to be a child then; for boys and girls were taught by danger to understand that the word *home* meant *country* also. If Napoleon had won, there would have been no British homes in Ireland and Scotland and England.

William Twopeny never forgot that lesson, though he lived to be an old man, dying in 1873. His heart was always young, and from first to last he worked very hard, learning to know what England was like in the past; how her people lived at home, and how they made beautiful things—houses and cottages and churches, barns and bridges, furniture of many kinds, and songs, plays, and poems, and beautiful pictures.

There was little that he did not know about the story of the English houses; even a few words of help and advice from him were worth years and years of loving patience in a search after truth—after knowledge; and so a great many persons, many of them distinguished, came to him for help when books were written on English churches and English homes. Yes, and we, too, must go to him now, not once, but many times, to make friends with his beautiful work, and to see how he travelled from London to many parts of England, often on foot, drawing with a pencil all the most beautiful things he could find, until his many albums of sketches made a history of English homes and churches, from the twelfth century to the seventeenth.

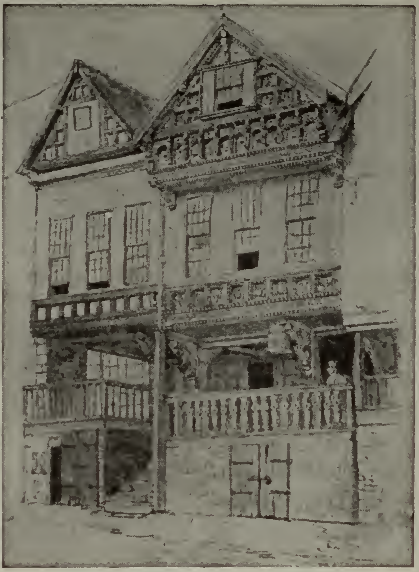
A year after his death these albums of drawings were presented to the Print Room of the British Museum, in accordance with his last wishes; and anybody who goes there can see them to-day. There are twenty-eight albums in all, and they contain many hundreds of exquisite drawings; yet their beauty is little known. The children of England have not yet heard of them, and the grown-ups are too busy to visit them. Twopeny, then, is a kingdom to be rediscovered; it is he who rules over the realm of home through six centuries of its long history.

And what do these books represent? Houses of English workmanship from the twelfth century to the reign of Charles II. Rooms, too, and beautiful details, like windows and doorways, large fireplaces, within which logs and faggots burned on fire-dogs; and wall-paintings, stained glass, and charming old furniture, which the generations have neither broken nor worn out. And there are castles, and huge barns built like churches, with naves and aisles, setting us thinking of those days when England owed all her riches to her fields, so that foreigners used to say that her wealth was wheat and wool, and that she grew and banked money on the backs of her sheep. Other drawings represent village



A BEAUTIFUL DRAWING BY WALTER TWOPENY OF POUND'S BRIDGE, NEAR PENSHURST, IN KENT churches, with tall spires shooting up toward the sun, as if they, like skylarks, wished to be near at the same moment to the points of heaven and home.

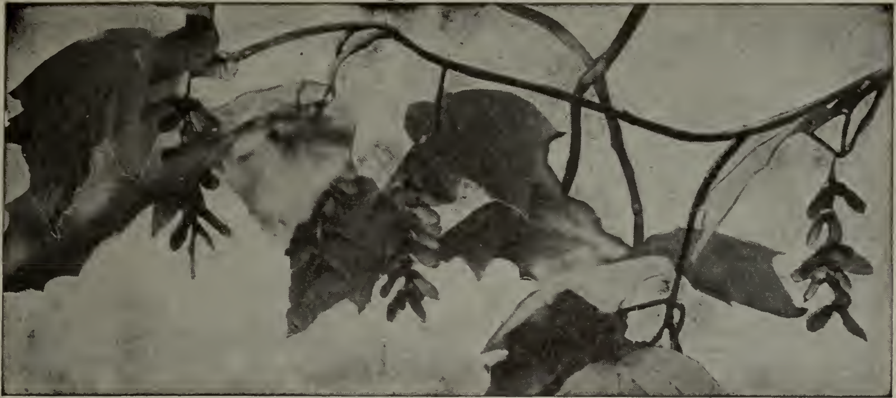
Only those who see his pictures can understand the delicate strength and beauty that William Twopeny put into his swift pencil-work. He drew as a musician plays, understanding all and loving all; there was magic in his touch, and a great sympathy in his heart. One thing he never could forget, and it is a thing that we must learn to see with our own eyes. It is this: that Twopeny realised that he, with his pencil, must make real the life in all things. For instance, the life in clouds is their lightness; we see that they are not heavy, but float overhead, and are blown about by the winds. Yet clouds in a great many pictures look as heavy as the walls of a house, or as solid as the trunks of oak-trees. Those pictures are bad, and we must dislike them as Twopeny did.


OLD HOUSES AT CHESTER

Or, again, what is the life of a pool of water? Its liquid transparency; it looks like a brilliant eye in the fields, gazing up at the heavens and changing with their colour. Artists must show that in their pictures; water must look like water, and not like hard, slippery ice.

STEPS AT POWIS CASTLE IN WALES

And the reality of many noble old houses must come into the artist's pictures too. We see from Twopeny's drawing that a house stands firmly on solid land, and that it is safe when tempests beat upon its walls. We see, too, that the stones are worn by time and use, but that weather-stains and mosses have hidden many a scar. And artists must show all this if their work is to be good, and to be loved. But when you take a pencil in your own hand and try to draw with its lead point, you feel weak and foolish, perhaps, for how can so much be done without bright colours, with just a few lines in different shades of grey? How, indeed! Yet Twopeny did it. He, with his pencil, could do whatever he wished, swiftly, and with ease. So let us make friends with his delicately strong work, and learn to love what he loved. It is worth while. But what about the man himself? Was he prosperous and happy, or did he die of despair, misunderstood, neglected, and desperately in need of money? Unluckily, very few facts have been discovered. There is no contemporary account of his life, though his drawing and his knowledge helped to make important books on English architecture. But three or four things are beyond doubt. Twopeny was well-to-do, for he was able to be a patron to another artist, J. W. Archer, who received from him a commisson to make twenty drawings a year of "Old London." Archer was a clever and charming draughtsman, and it is pleasant to know that he won so much friendly help from Twopeny. His work also can be seen in the Print Room of the British Museum. We learn, again, that Twopeny's father was a student of the past, a devoted antiquarian, living at Rochester, but that Twopeny himself made his home in London. As we have seen already, he travelled much in all parts of England. We can follow his travels best in his work, which, after all, is the best autobiography that a true man can write.



The Fruit of the Striped Maple.

CONTINUED FROM PAGE 5572.

AMERICAN TREES IN SUMMER

OUR continent is so vast that the plant life in one corner in no way resembles that of another. Speaking in general terms, each corner, or desert, or mountain range, or river-bottom, or sea-beach has its own variety of soil and climate and a plant population that has fitted itself for ages to withstand the trials of life in that particular locality, be it large or small.

These great divisions of plant life are called "floras," and so distinct are they, except where they mingle on the border-lands, that skilled botanists say that if they were taken blindfolded on a magic carpet to any part of North America, by looking around at the plants, they could soon tell pretty nearly their whereabouts. If they should be dropped in a grove of the trees which we have pictured, for instance, they would be sure that they were in the northeastern part of the United States, and they might guess that they were within a hundred miles of New York.

Let us imagine that the botanist's carpet has descended in the scraggy branches of a sweet-gum tree; he would know that he was east of the Mississippi and not far north of the Hudson, at least, for the sweet-gum does not go much farther in that direction. On the other hand, if he found the lovely little striped maple he would know that he must be north of Georgia, for this tree rarely travels further south. The odorous bayberry would warn him that he was near the coast; and tree after tree would add its evidence to help him to locate himself.

In this way, we have come to think of certain trees, or groups of trees, as always to be found in certain parts of America. When we speak of the southeastern coast, we promptly remember the tufted palmetto; while the persimmon and magnolia, and the moss-draped live-oak are always present in our dreams of the Mississippi bayous; and of course we never forget the white pines of Maine.

But Canadians always remember the maples, for these trees grow so abundantly in their country that a maple leaf has been chosen as the emblem of the Dominion. They have many varieties of maple. One of them we frequently read about in hunters' tales, but usually termed moose-wood. The moose love to eat its great, tender buds that are close-wrapped in crimson scales. Although it rarely is seen growing alone, it is readily recognised in the copses by its smooth green bark, striped with white, and by its great,

Copyright, 1911, by M. Perry Mills

soft, three-lobed leaves. It is almost a shrub when compared with the great red maple and the sugar maples. The former is one of the first trees to turn its coat and warn us of the coming of winter, showing vivid patches of red here and there very early in autumn. The sugar-maple, on the contrary, is inclined to become golden, or pale scarlet, and often its foliage is mottled with both colours. While the red maple adorns itself with tufted, deep-red blossoms before the leaves unfold, the sugar-maple drops its tassels of honey-coloured flowers beneath the newly opened foliage.

THE MAPLE

A well-grown field sugar-maple is a magnificent tree, shaped something like a pyramid with solid-looking, dark foliage. Its leaves are very simply lobed with squarish divisions. Its pale-tinted wood is hard and very heavy, and as we all know, is made into hardwood floors, furniture and the like; those two varieties called "curled" and "bird's eye" being especially valuable. But altogether the most interesting thing about the sugar-maple is the sugar! It is a small New England farm that has not a sugar-bush somewhere; and it is one of the pleasant duties of the farmer to go out in the snowy springtide, and by piercing holes in the bark of the sugar-maple, and fixing little spouts therein, to draw off the sap that is rising upward just under the rough bark.

The sap in this stage is colourless, thin and faintly sweet to the taste. By careful boiling the water in the sap is got rid of, and in time the liquid turns to sugar. The sugar-boiling is a time of gaiety for young folks, who frolic in the snow and about the huge bonfires under the sap-kettles, and eat maple sugar in every form they can invent.

The farmers learned this art from the Indians, who made the sugar, and sold it, dark-brown and coarse and filled with bits of twigs and leaves, but nevertheless delicious, in little birch-bark boxes. Sometimes they took out the water from the sap by freezing it night after night, each morning throwing away the cake of ice that had formed and which contained most of the water, leaving the sugary thick fluid. They even ate scrapings of the sappy, sweetish bark, as the southern negroes chew sugar-cane. Some Indians have a curious habit of putting maple sugar on their meat or in soup, instead of salt, which they do not like, as well as eating it as we do, on hominy or boiled wild rice.

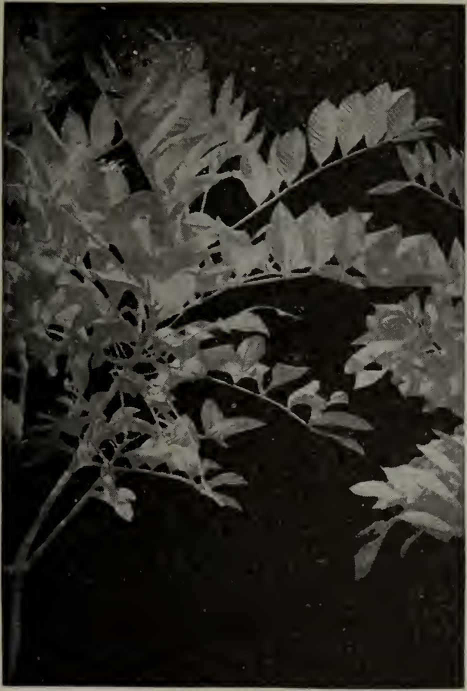
THE LOCUST

Another sweetmeat for the Indian children was the pod of the honey-locust. This is a handsome tree that has travelled far from its original home in the middle west, and has spread widely its flattened top in many a park and highway. The leaves are composed of many small leaflets, among which the clusters of long, flat, black and twisted pods are easily seen, especially as they stick to the branches during the winter. They are filled with a sweetish, watery pulp in which the hard seeds lie, and this is pleasant to the tongue. The honey locust is distantly related to the acacias and mimosas that travellers in African deserts tell us about. We remember that they also speak of the vicious thorns that endeavour to protect the feathery foliage, but which the giraffe ignores when he reaches over the mimosa tops with his long neck.

Our locust, like them, is well armed with enormous spines, polished and branched, every spur being quite capable of stabbing to good effect. They appear in the most unlikely places on branches and trunk, often in groups. Unlike the common locust, the flowers are inconspicuous, but its trembling foliage, which scarcely casts a shadow, gives the tree a charming delicacy of outline. We may notice that the pale, little leaflets rise up as the sun sets and press their upper surfaces together. This is called their "sleep," and prevents the escape of heat from the delicate leaves at night, as well as reduces the chance of injury from excessive coolness, heavy rains, and so forth.

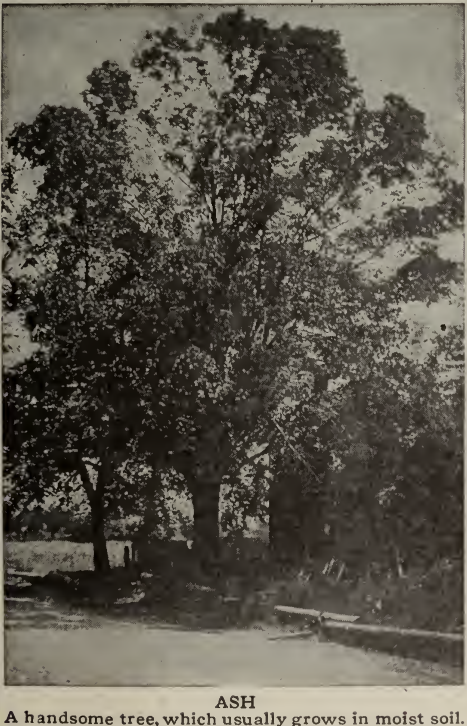
THE TULIP-TREE

Some of our trees have leaves of so unusual a shape that if we once see them, we shall never forget them. Such are those borne by the beautiful tulip-tree,

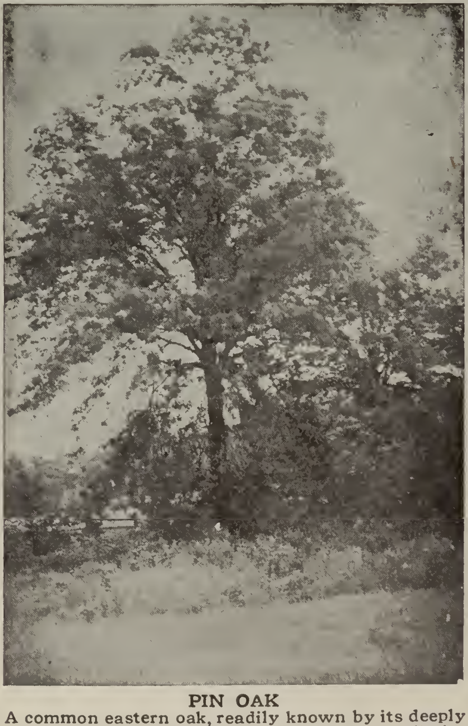


POISON SUMACH
A shrub or small tree growing in swamps, that is to be avoided. It is poisonous to the touch. It has upstanding leaflets on red stems, and white berries.

SHADBUSH
A small tree or shrub, which blooms early in the spring. Its white petals are very narrow. The reddish fruit is quickly eaten by birds, who rarely leave a berry on the tree.



ASH
A handsome tree, which usually grows in moist soil. Its elastic tough wood is valuable for many purposes. The European ash has many myths told about it.



PIN OAK
A common eastern oak, readily known by its deeply cut, rather small leaves, and its drooping lower limbs. It is frequently planted as a park and street tree.

which one might describe as square in general outline, with a notch taken out of each side and another at the tip. They have changed but little in shape since prehistoric days. Each leaf comes out of the bud folded upon itself, and within an oval case of translucent tissue, which splits to let the swelling leaf out, the two halves remaining at the base of each leaf-stalk for some time. These leaves tremble like those of the poplar, and the tree is often called "white" or "yellow" poplar. It bears very handsome flowers, on the tips of its upturned branchlets. They much resemble tulips in shape and are brilliant yellow, with a splashing of orange and pale-green at the base of the cup; the sap-green tone of the foliage about each flower harmonises most charmingly with it.

This tulip-tree is one of the most magnificent trees in our forests, growing especially large in the Ohio Valley. In the prime of life, if it has had sufficient moisture and room, it forms an almost perfect cone from the ground to its topmost spray. It is famous, moreover, for the height and unbroken straightness of its trunk, that rises like a column, no matter how shapeless and broken the head may become. This was observed by the Indians, who took advantage of it, and of the softness and lightness of the boles, by digging great canoes out of them. Carpenters usually refer to the lumber of the tulip-tree as "white wood" and it is a favourite material for finishing the interiors of houses, especially when the woodwork is to be stained and painted, for it is easily worked smooth and soft. Panels of carriages are also preferably made from it.

Even after the leaves drift away, the tree retains its interest, for it is then seen to be laden with countless cones of fruit. When ripe, we discover that the cones are formed by row after row of upstanding winged seeds; and on dry, sunny days, we will find these seeds flaring in circles about the base of the little interior cone they have been overlapping. A stick thrown among them, or even a high wind, will send yellow clouds of the seeds to earth furiously twirling as they descend.

THE ASH

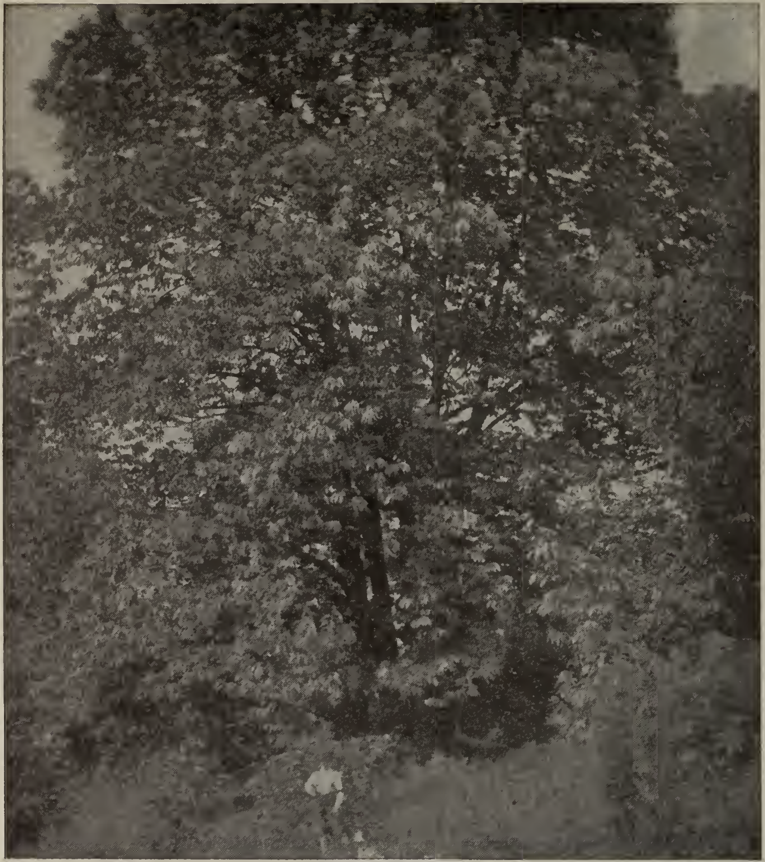
Other winged, paddle-shaped seeds come spinning to their last resting place from the ash trees. They are called "keys," and are gathered into great bunches on the branches, which sweep outwards in an interesting double curve and bear leaves of several large leaflets.

There is little of the romance that is gathered about the European ash included in our folklore, but it is justly valued for the strength, toughness and elasticity of its wood, which the Indians used for paddles, finding the tree very handy, as well, since it frequently overhangs water courses. Even nowadays oars are made of ash, as well as tool-handles, wagon-shafts and other parts of vehicles, besides many other things.

Some of us may have seen "alligator-wood" sold on city streets and wondered what it really is. The irregular twigs, gray and crested with wavy ridges of a material like ash-coloured cork, seem foreign and unlikely to grow in America; yet one can break them from trees within the limits of New York City, — trees bearing the sonorous Latin name "liquidambar," and the less romantic English title "sweet-gum." Both names refer to its resinous sap, which may be used in place of storax, an incense gum from over-seas.

THE SWEET-GUM

The sweet-gum is another great forest tree, growing southward from Connecticut. In youth it appears to take a very slender, spire-like shape, but becomes less shapely as it ages. The leaves are cut deeply into several sharp-pointed lobes, and look like great green stars. In winter the ground beneath a sweet-gum is strewn with curiously spiked or horned balls that prove to be its fruit. A mass of two-beaked, hard capsules growing together like a sphere, is each fruit, and there is need of the number of them that we see swinging from the leafless twigs, for there are few fertile seeds in each sphere. In spite of its size, the wood of the sweet-gum is not valued highly except for some odd devices where its twisted and interwoven grain is useful, on account of its non-splitting habit.



CHESTNUT

A fine forest tree, formerly of great value not only for its sweet nuts but for its wood, that is strong and easily split. The trees are rapidly disappearing.

SUGAR MAPLE

A tree which often grows on rocky hillsides. It furnishes a valuable wood, heavy and firm, as well as sugar which is made from its sap.

THE PIN-OAK

One could write a whole article on the oaks alone of this country. We have already spoken of the white and live-oaks. In this article we shall speak of the pin-oak, one of the most easily recognised and picturesque of our eastern oaks, and one that is frequently planted in highways and parks, because it grows quickly.

In the forests it generally chooses moist or even wet soil; and when youthful it is a pyramidal little tree with thickly-set branches standing out horizontally all around the stem, and a maze of little branchlets and spiky interwoven twigs. But when older, the lower limbs droop until they rest dying and broken against the trunk, while the middle and upper limbs rise in an almost unbroken series of sweeping lines, which gradually change from the droop of the hanging lower limbs to the uprightness of the vertical leader at the top. The small acorns falling from their shallow cups are sometimes striped; the pretty foliage is deeply cut, often nearly to the mid-ribs. The wood is strong, hard and light-brown in colour.

THE POISON-SUMACH

While we are prowling about the margins of swamps looking for the pin-oak, we must take care not to run into, or handle, the *poison-sumac.* It is most dangerous in early summer, for then the flowers are opening, and even the flying pollen seems to be quite able to cause that itching inflammation of the skin which tortures some people so greatly, whether caused by the poison-ivy of the fence-posts, or by their relative of the swamps. The latter is a shapely shrub or small tree, often growing among alders and elders. Its rather long and bare, slender limbs bear at the top a great cluster of leaves composed of from seven to thirteen pointed leaflets. These *stand up* from the mid-rib in a way that is quite unlike the attitude of the leaflets in other trees. They are very glossy, of an odd shade of dark-green above, and have red stems, while the mid-rib from which they spring is also red. This is a point to be remembered! The little green flowers fall loosely in long spray-like panicles from the axils of these leaves. In the fall, the leaves very early change to unusually brilliant shades of orange and vermilion, and when they have fallen to the mud, grape-like clusters of white berries still grace the top of the branches, tempting birds to eat them, and occasionally, I fear, tempting young folks with an eye for winter decoration, to pick them — with sad results — for root and branch, winter and summer, the poison-sumac is poisonous to the touch. Practically the same thing can be said of its more common cousin, the poison-ivy, which crowns fence-posts and old stumps and rears its slender branches among the thickets. This, however, has only thin leaflets, without the warning red stalks, but has the same gloss on its dark-green leaves, and assumes the same brilliant autumnal colouring.

W. H. Gibson has given us a catchy little jingle about the sumacs which may help us to remember the important differences between the poisonous and harmless sumacs.

"Berries red,
Have no dread!
Berries white,
Poisonous sight!
Leaves three,
Quickly flee."

One should be cautious, moreover, in going to the leeward of a fire in which the poison-shrubs are burning, and should never chew bits of wood without first examining them; the smoke from the burning, or the chewed-up splinter of bark may result seriously even for persons who are not usually affected.

THE SHAD-BUSH

It is a relief to turn to the innocent little June-berry which adorns itself with slender-petalled white blooms before its cottony leaves have fairly left the bud, and while the shad are swimming up the rivers, — whence its homely name of shad-bush.

Service, or more commonly "sarvice" berry, it is also called. It frequently grows into a small slender tree, and, if the birds would only leave it alone, would ripen its sweetish fruits, very like plump rosehaws in appearance. But the mealy pulp appears to be so

TULIP TREE

One of the handsomest of our flowering trees. It has a squarish, deeply-notched leaf of peculiar shape, tulip-like yellow flowers and a noticeably straight shaft.

LIQUIDAMBAR

A great tree easily known by its curious fruit, like spiked spheres, and its handsome star-shaped leaves, which change to brilliant reds and purples in autumn.

delicious to all birds, that one scarcely ever finds ripened fruit beneath the cherry-like foliage. It is said that Indians picked the fruits, but I cannot imagine where they found enough to make it worth while. The birds practically make it useless to improve the service-berry.

It is not from the attack of birds, but from those of little gnawing animals that great nut trees seek to protect the sweet, rich kernels of their fruit; and they are not altogether successful, we think, when we notice the number of shells bitten open and emptied by squirrels and chipmunks.

THE BUTTERNUT

Yet a butternut must present quite a problem to the eager teeth of even a red squirrel. For, when it falls, it is enveloped in a sticky husk, and when this disappears, it leaves a four-ribbed oblong nut two inches long, with a stony-hard shell, bearing thin, saw-edged ridges.

All summer, at first soft and green, the butternuts have been ripening in clusters at the top of the branches, tucked in at the bases of the great leaves broken up into many leaflets that are not a whit too big for the fine tree that bears them. Butternut brown was the colonial dye from this tree — some say from the husks of the nuts (which certainly stain the fingers) while others claim that the inner bark gave the tint. At any rate, the wood is pale brown, and is sometimes used for interior house-trimmings.

THE CHESTNUT

It is fitting that our little talk about the chestnut tree should come at the end of the story, for unless some clever scientist discovers a remedy for the disease that is killing them, our chestnut groves will soon be destroyed, just as the apple orchards are vanishing under the curse of the San José scale. The latter can be controlled by spraying, but the fungus disease of the chestnut, which girdles and soon kills even great trees, works under the bark. It will not be long before the noble trees, with their gray, deeply furrowed bark, and long-pointed, sharply-toothed leaves, will be only memories, as well as the sweet, glossy nuts, hurled by Jack Frost out of the velvet-lined husks in which they have lain all summer protected against bird and beast by the fearful bristling armour of prickles on the outside of those spherical husks. What will the railroads do without their chestnut sleepers, riven out of the tough, brown, durable and easily split wood? or the carpenters, who have used it in finishing houses? or the farmers who have made fence-posts and a thousand and one things out of the chestnut poles? And how we shall miss its great round domes, lightening the colour of the forest in June with their masses of pale yellow tassels of bloom, that will turn no more into the red-brown nuts with the sweet kernels.

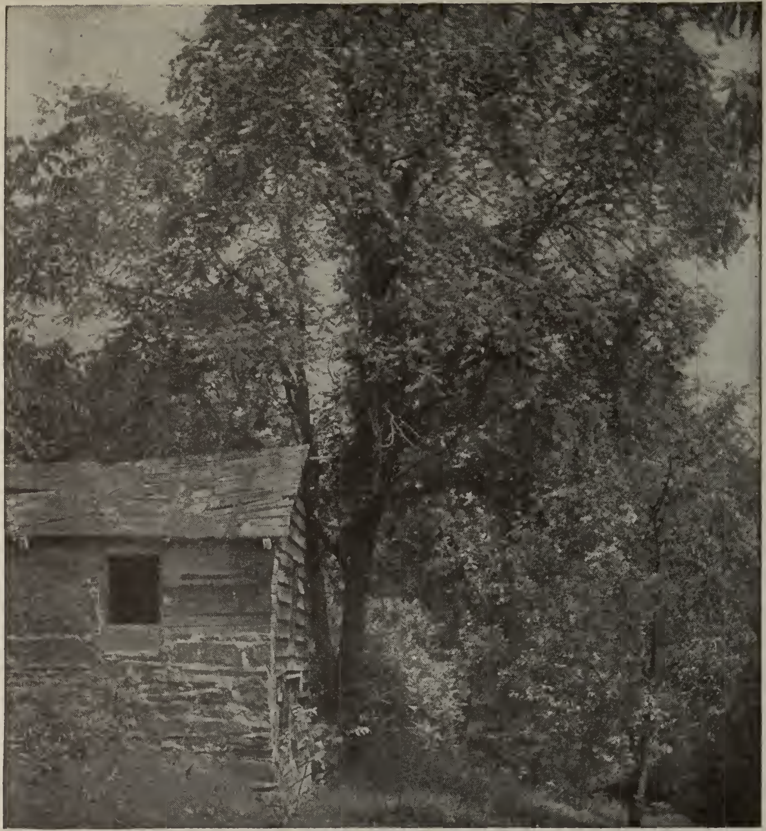
We are quite used to eating these sweet nuts, but we scarcely think of adding bark to our table dainties. School-children, however, delight in nibbling the smooth, thin, spicy bark of black birch-twigs; and they do not realise that in Sub-Arctic Russia the poor peasants depend upon birch-bark as a sort of salad in their meals.

The earliest settlers in New England found that certain Indians, called "tree-eaters," by wealthier folk, when they had devoured their scanty winter stores of food, ate the tender bark of various trees. Moreover, in the western states, where the great poplars line the water-courses, the Indians scrape off their sweet and sappy inner bark for a delicacy. "It is their ice-cream," said an educated red man. Farther west, the sugar- and other pines are similarly stripped by little scrapers carried for the purpose.

One of the oddest forms of bark-food, that much resembled oakum, or the fibrous coat of a cocoanut, was offered to explorers on the Pacific Coast, who found that they were eating dried hemlock-bark, soaked in salmon oil, which was, unfortunately, usually rancid.

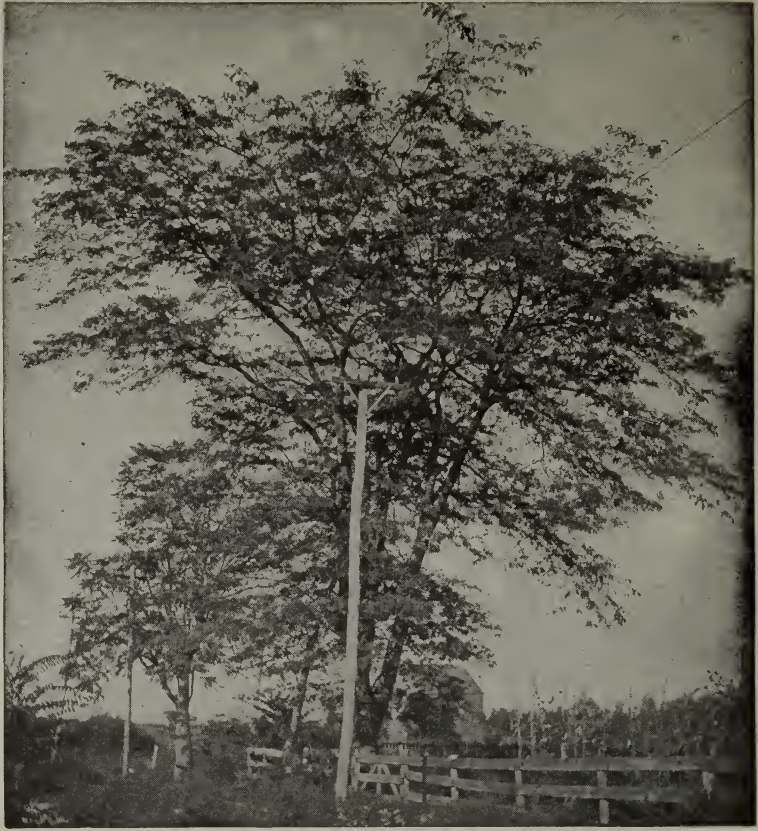
Besides its occasional use as food, bark is valuable in many other ways. That of the hemlock, the oak, and the birch is used in tanning leather. Mulberry- and cedar-bark was woven into clothing. Cork is the spongy bark of an oak, growing on Mediterranean shores.

CONTINUED ON PAGE 5723



BUTTERNUT TREE

A very close relative of the black walnut, which is sometimes called white walnut. In foliage and habit it somewhat resembles the former tree, but is smaller and not so valuable.



HONEY LOCUST

A tree which is often confused with the flowering locust. Its coarse-grained wood is sometimes used for fence posts. It has long, black pods filled with pulp which is first sweet, then acid.

THE COMING OF SPRING

Photograph taken by Arthur V. Abbott

DIGGING THE PANAMA CANAL

EVER since explorers found that only a few miles of land separated the Atlantic and Pacific Oceans between the two continents, men have spoken of joining these two oceans by digging a canal. It was evidently so expensive and so difficult that no real attempt was made until about the year 1878, when a French company secured from the Republic of Colombia the right to dig a canal through the Isthmus of Panama. At the head of the company was Ferdinand de Lesseps, who had succeeded in separating Africa from Asia by means of the Suez Canal, and spurred on by his success in this great work, he felt sure that he could accomplish this task on the other side of the world.

It was found, however, that the two pieces of work could not be compared. The Suez Canal is only a great ditch through the sand or through shallow lakes. While the weather is hot the climate is not particularly unhealthful for Europeans and workmen could be secured from the neighbouring tribes.

In Panama tropical conditions prevailed. During the rainy season vegetation grew up almost in a night, drainage was difficult and it was found that many men engaged on the work died. Mountains had to be dug through. The attempt to get the inhabitants of the district to work was unsuccessful. Why should they work? The soil was so rich that a few hours' work in the course of a month would furnish abundant food, and therefore they could see no reason why they should work, hour after hour in the rain or the sun, carrying away soil, blasting the rock and doing the other hard tasks which are necessary to be done.

At first it had been announced that $120,000,000 would be sufficient to do the work; then the larger sum of $180,000,000 was announced, and finally it was seen that this latter sum would not begin to see the work completed. Though Mr. De Lesseps' plans were good and though much of the work done was well done, some bad men got control of the company, much money was stolen and the company was thrown into debt. Finally De Lesseps was arrested, though it seems that he himself had not been guilty of dishonesty. The French people would not put any more money into the Canal and so for several years the whole plant lay idle. The houses of the Canal workmen were hid in vines in the undergrowth which sprang up. It seemed that all traces of the French attempt were to be wiped out.

Meanwhile in this country there was a great interest in the Canal and this interest grew as our Western states developed. Some men wished to buy out the French company and continue the work across the Isthmus of Panama. Others preferred to cross the Isthmus of Nicaragua, further to the north. Here the distance between the Atlantic and Pacific was much wider, but it was expected to make a large lake and a river a part of the Canal.

Another marvellous project was to cross the Isthmus by means of a ship railway. An immense frame or cradle capable of receiving the largest ship was to be constructed. This was to be mounted upon many-wheeled trucks running upon several railway tracks. These tracks on each side of the Isthmus were to extend into the sea. The cradle would be pushed out into the water, the ship was to sail in and the powerful engines would then draw the trucks out upon the land and carry the ship over to the other side of the Isthmus, where it would be lowered into the sea.

Finally, after much discussion, the Panama route was chosen, the French Company was bought out for $40,000,000 and the United States was ready to begin. Just then the Republic of Colombia seemed to intend to go back

Copyright, 1911, by M. Perry Mills.

upon the bargain it had made and to charge the United States a much higher price than had been agreed upon for the right to cut the Isthmus. The citizens of the Isthmus were unwilling to see so much money lost and therefore they suddenly declared themselves independent of Colombia in 1903, and created the Republic of Panama. An agreement was immediately made with the new republic. The United States agreed to pay $10,000,000, and after ten years had passed to pay $250,000 a year.

The building of a sea-level canal was at first mentioned, but soon, though less than half of the committee which had charge of the work reported in favour of a lock canal, it was decided to build the latter type, that is to say, a canal which is not level all the way across but one in which the boats are raised by means of locks as explained in another part of our book. The Republic of Panama granted to the United States a strip of land five miles wide on each side of the Canal. This is called the Canal Zone. Also the privilege of controlling the health conditions of the cities of Colon and Panama was granted, though the United States has nothing to do with the government of these cities outside of the health matters.

Now let us see what has been done. Beginning in Limon Bay on the Atlantic side near Colon, the Canal extends 500 feet wide and 41 feet deep to Gatun, about seven miles away. Here are the first locks, three of them, each a thousand feet long. A great dam, which is more like a hill, has been thrown across the valley of the River Chagres. This hill is so thick and contains so many million loads of earth and stone that it is not believed that the force of the water can ever break it, though the river sometimes rises 25 feet in 24 hours. This dam makes a great lake of the surrounding country and through this lake the width of the channel is for a part of the time more than one thousand feet.

The most interesting part next to the building of the great dam is possibly Culebra Cut, where the Canal cuts directly through a mountain. We show you a picture of this and it will make you realise how small men are. This work has been done chiefly by means of steam shovels which are also shown you in the picture. These great machines run by engines scooped into the side of the hill, gathering up hundreds of pounds of dirt, soft rock and shattered stone. The man in charge with a little twist of the wrist turned the great scoop so that its load dropped into a car standing near. When the cars were full the engine pulled off to a section which was to be built up rather than cut down.

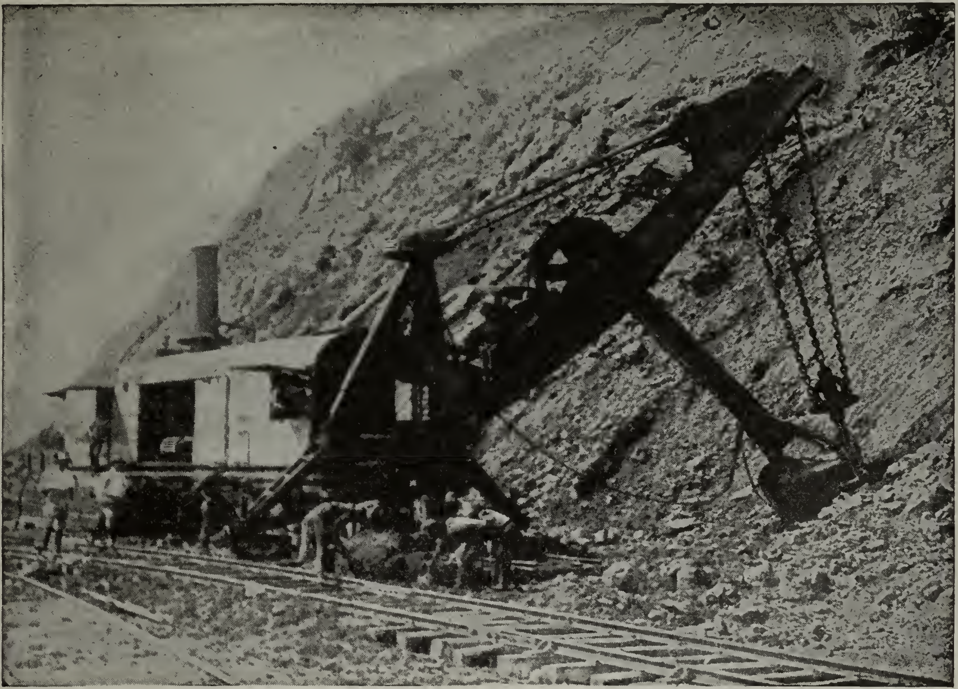
The steam shovels were of various sizes. The one called the "95-ton shovel" seemed to do the best work. This carried as high as five cubic yards at a time. When a rock was too large to go inside the shovel it was blasted into smaller fragments. The trains which carried away the dirt and rock were very long as it was sometimes necessary to carry the material many miles. Some of it was used in filling in swamps, and much was used to extend the breakwater upon the Pacific side.

In 1855 a railroad was constructed across the Isthmus and this road is now owned by the Government. The change in the plan of the Canal would bring a large part of the tracks under water, and therefore a new line was laid out for it. Much of the material taken from the great cuts was used to make embankments for this road. When enough material had been dumped in any one place, by a very ingenious contrivance the whole railroad was lifted and moved several feet to the right or left as the case might be. Of course this work was slow and the track was not very smooth. There were dozens of these temporary railroad tracks along the Canal occupying one position to-day and an entirely different one next week.

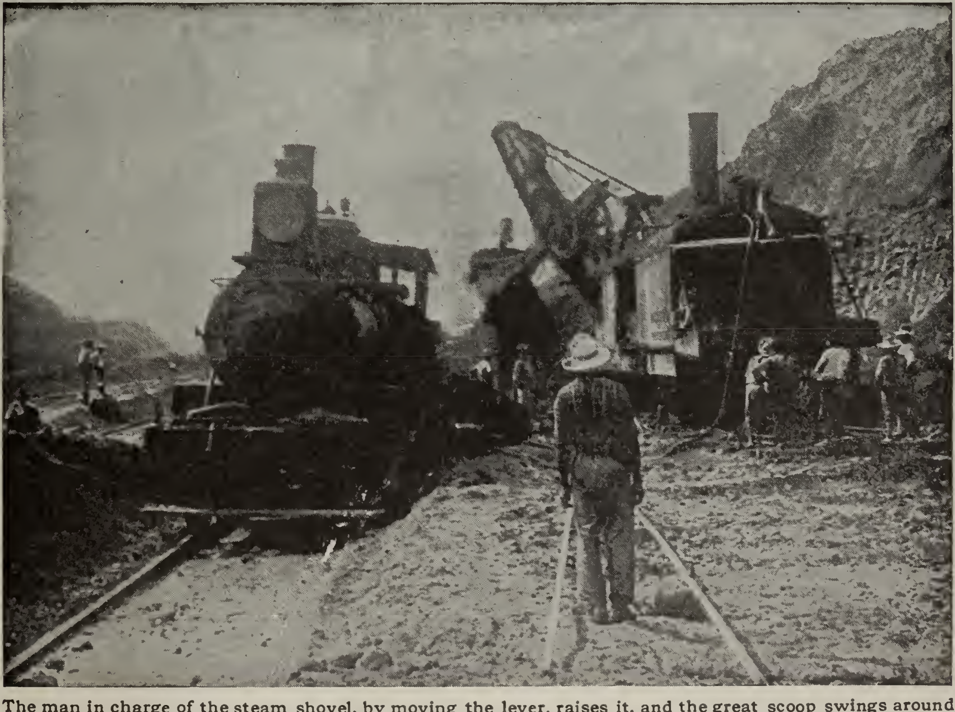
Culebra was the most difficult and most uncertain part of the work, for just when the men thought they had gone far enough the earth slid down from the sides again, sometimes filling up the Canal entirely. These slides continued after water was let into the Canal.

Though the actual work in digging the Canal was wonderful, far surpassing

THE MONSTER THAT EATS THE HILLS



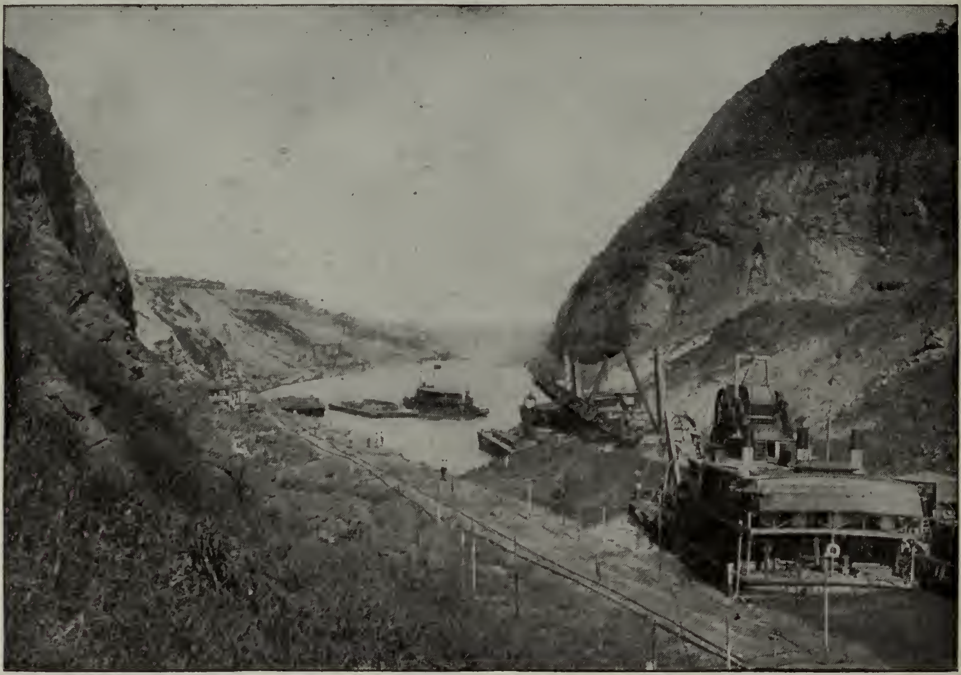
Without the steam shovel such a work as the Canal could never be accomplished. Here you see the great scoop holding five cubic yards, gathering up earth and broken stone which are to be moved to another place. Five cubic yards weigh several thousand pounds.



The man in charge of the steam shovel, by moving the lever, raises it, and the great scoop swings around and deposits its load in a dump car. When all the cars of the train are full the engine draws them to a place where it is desirable to fill in rather than to dig out.

Photographs copyright by Keystone View Co.

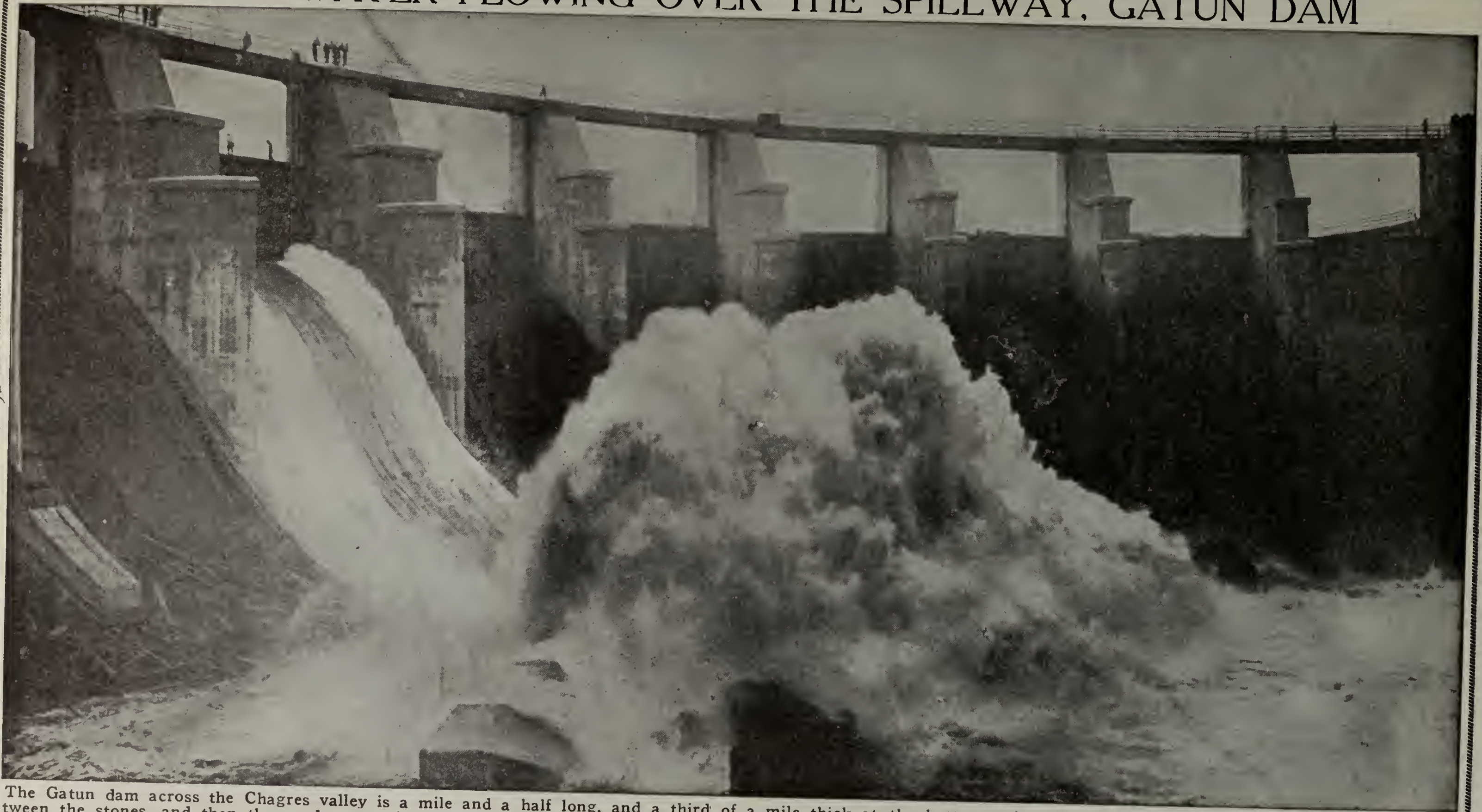
anything which has ever been accomplished before in the history of mankind, the work of the Government in making the Isthmus healthful and in taking care of its army of labourers was even more surprising. Years ago both Panama and Colon were subject to yellow fever which at times almost paralysed business. Since it has been discovered that yellow fever is always caused by the bite of a particular kind of mosquito the Government engineers had a basis upon which to work. The sanitary force under Dr. W. C. Gorgas, installed a system of sewerage in the two cities, caused the streets to be paved, and prevented the collection of heaps of garbage and stagnant water in which mosquitoes might breed. They kept the undergrowth cut down along the Canal and sprayed the ditches with crude oil, thus killing the young mosquitoes. As a result yellow fever has become almost unknown. Before any actual work was done upon the Canal nearly two and a half years were spent in making the region healthful. Over two thousand buildings were constructed, including offices, hospitals, hotels, kitchens, shops and barracks. Many of the buildings left by the French company were repaired and made of use. It was decided, in order to be sure that the men should have a supply of well cooked and suitable food the Government must undertake the work. Good wages were paid to the labourers and they were furnished with excellent meals at low prices. Provision was also made for the men who occupied more responsible positions. They were encouraged to bring out their families. The single men lived in barracks or cottages and boarded at the hotels under Government supervision. The married men were furnished with quarters and had the privilege of buying direct from the Commissary Department. This Commissary Department was very important and controlled several important manufacturing plants. It was in reality a great department store. It controlled an ice plant which turned out about 90 tons of ice a day. It baked 14,000 loaves of bread, made 250



The most stubborn part of the cut through Culebra Mountain was the Cucaracha slide. Here the side of the hill slid down into the canal after water had been admitted, entirely filling it. Some of the material was pumped out by dredges and the remainder was taken out by steam shovels. The struggle with the slides caused the death of Colonel Gaillard, the engineer in charge of this part of the work.

Photograph by Brown Bros.

WASTE WATER FLOWING OVER THE SPILLWAY, GATUN DAM



The Gatun dam across the Chagres valley is a mile and a half long, and a third of a mile thick at the bottom. A core of stone was made, clay was forced in between the stones, and then thousands upon thousands of loads of earth were dumped upon it. In the centre of the valley was a small hill, and here the dam is of concrete, with fourteen large gates. This is called the spillway. When the water in Gatun lake becomes more than eighty-five feet deep, some of the gates are opened, and the waste water flows through, and finds its way into the Atlantic.

gallons of ice cream, roasted a thousand pounds of coffee and was able to take care of 7,500 pieces of laundry a day. Refrigerator cars ran from its cold storage warehouses to different parts of the Zone and every morning the supply train left the central point, depositing such goods as were wanted at the local commissary stations, where the employees, hotels, etc., made their purchases. Excellent hospital accommodations were provided at Ancon and Colon. As a result of the vigilance which has been exercised by the sanitary department, health conditions are better than in many American cities.

In the messes arranged for the men the division was by the coin in which the men were paid. One set of accommodations was provided for those on the " gold roll " and another for those on the " silver roll." Generally Americans and Europeans were on the gold roll and the West Indians and the residents of the Zone on the silver roll. The meals of those on the silver roll were charged for at one price, and those on the gold roll at another. In most of the mess halls for the gold-roll employees there were two dining-rooms, in one of which the employees might eat without their coats.

In the Zone all the machinery was on a grand scale. The mixers of concrete for example, were so large that a man seemed a pigmy beside them. The concrete was mixed almost automatically. A grab bucket darted down into a pile of sand, filled itself, ran back along an overhead track and dropped its load into the mixer. Meanwhile another went for a load of stone. The cement had already been emptied from sacks or barrels. On the Pacific side the two principal locks by which our ship descends from its height are at Miraflores. Here the Canal drops fifty-five feet. It has already dropped thirty feet at another point, for much of the Canal is eighty-five feet above sea-level. The variation in the tide is much greater on the Pacific coast than on the Atlantic.

It is estimated that the Canal has cost almost $400,000,000. Such a sum staggers one. In fact, we cannot comprehend this amount of money. It is exceedingly doubtful if the Canal can ever pay a profit. Though the locks can be filled in eight minutes a considerable time is necessary to take a ship through, and it is estimated that not more than fifty-eight ships can pass through in a single day of twenty-four hours, — for the Canal will be so brilliantly lighted that ships will pass by night as well as by day. The ships are not allowed to go through under their own power, but will be towed by electric locomotives. It is probable that the tolls charged can never be large enough to pay a fair rate of interest.

But it was not for direct profit alone that the United States determined to build the Canal. Our ships are at a great disadvantage in trading with Asiatic countries, since our chief seaports are upon the eastern coast and in order to reach these eastern markets a ship must first sail across the Atlantic and through the Suez Canal or else go altogether around South America. It is hoped that the building of the Canal will help very much to develop the Mississippi Valley by allowing to its products a quicker way to market.

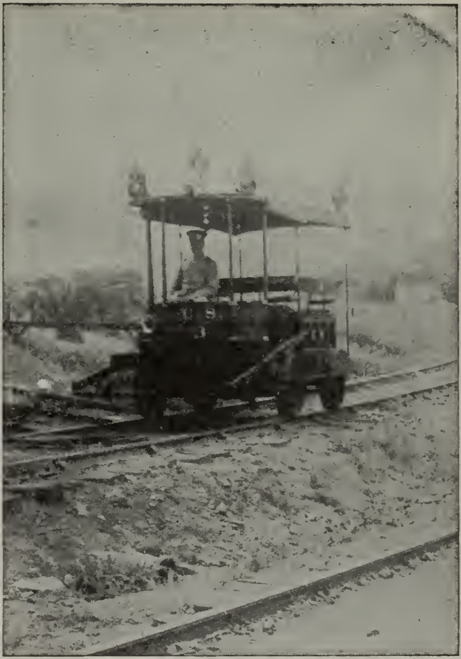
Then, too, the condition of affairs at the beginning of the Spanish-American War has not been forgotten. Then our fleet was divided, and your parents can tell you something of the wonderful voyage of the Oregon around Cape Horn and into the Atlantic Ocean. With the Canal ships can be easily transferred from one ocean to the other.

The first boat to go through any lock on the Canal was the little tugboat, Gatun, which was lifted through the three Gatun locks on September 26, 1913. This was a great day for all engaged on the work, for it showed that the end of their labours was at last in sight.

But whether all these expectations are realised or not, it must make us feel proud that our country is doing this great work. Few countries in the world are rich enough to undertake such a work and it is certain that no engineers could have done better than Col. G. W. Goethals, the chief engineer, and his principal assistants, all United States Army engineers, have done.

SCENES ALONG THE ZONE

When the French Company became bankrupt in 1889 much of the machinery was left on the ground. Here we see hundreds of good locomotives overgrown by vines and eaten up by rust.

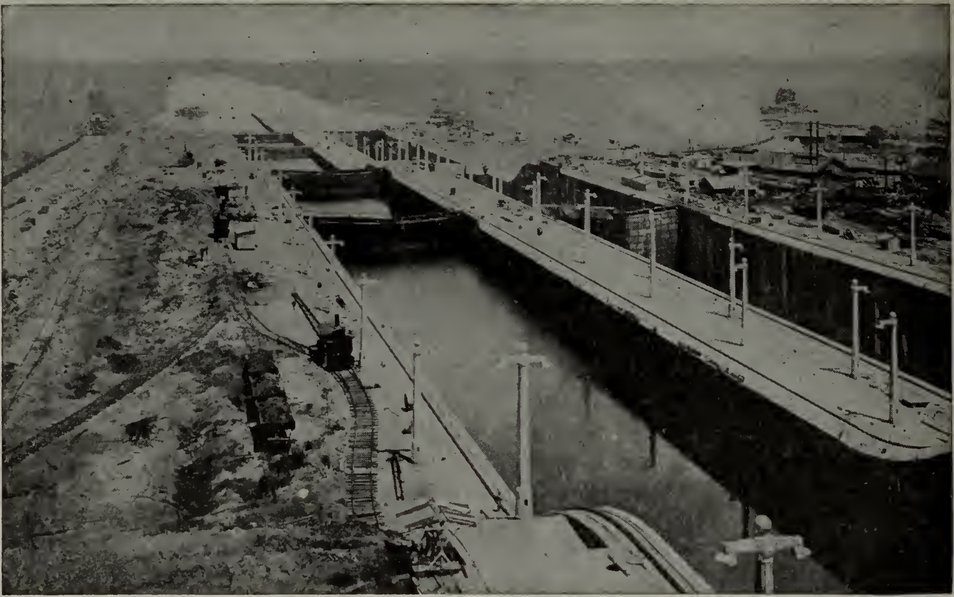


The engineers and supervisors move from one part of the work to another in the railroad automobile, a picture of which you see here. It is like any other automobile, except that it runs on rails.

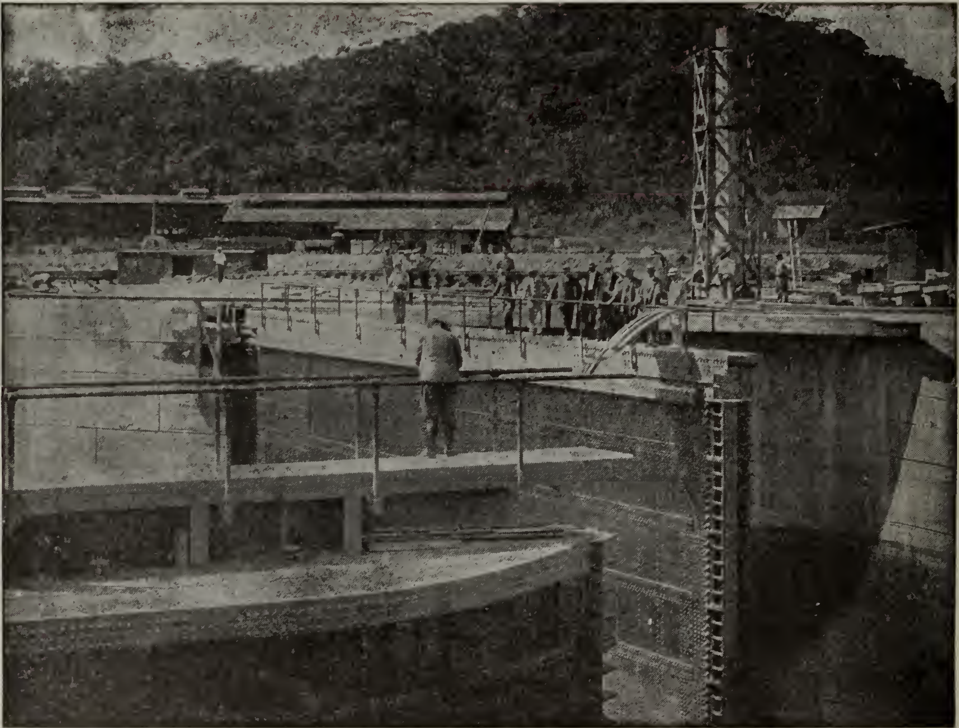
Every provision has been made by the government for the health and comfort of those working on the Canal. Here is a picture of the attractive grounds of the Hospital at Ancon.

Photographs copyright by Keystone View Co.

GATUN LOCKS AND THE GREAT GATES



Here is a view of the Gatun locks looking toward the Atlantic Ocean. The first gates are to keep out the tides. When the ship enters the first chamber the gate is closed behind and water is let in from the lock above, raising the boat over 28 feet. The gate to the middle lock is then opened and the water rises another 28 feet. This process is then repeated and the boat rises another 28 feet and passes out into Gatun lake. The locks will accommodate a ship 1,000 feet long.



This picture shows a pair of the immense lock gates, which open and close like doors. They are thick, as you see, and very strong. Some of them are eighty-two feet high. The machinery to move them, while very strong, is still very easily operated. If by any chance one of them should break or refuse to work, a temporary gate can be set up very quickly.

CONTINUED FROM PAGE 5578.

DOES SYMPATHY HELP US?

SYMPATHY does help us, and it *is* help just as truly as money would be, and it often helps where money would be of no use at all. This we see every day when people are suffering, not from lack of money, but from illness or pain. In such cases sympathy is worth all the world to them.

We are so made that sympathy, besides comforting the mind, may even relieve the pain. We all know how the sympathy of someone we love, showing itself by quietly stroking the forehead, may really relieve a headache. The interesting point about this power of sympathy is that it must come from a person with whom we are "in sympathy," as people say.

If it comes from the wrong person it will do more harm than good. Very much of the success and usefulness of the most successful doctors and nurses comes not from their skill, but from their power of sympathising with their patients.

HOW DO SPECTACLES HELP US TO SEE?

Of course we understand that the spectacles do no seeing themselves, and there must be many kinds of difficulty in seeing for which no spectacles can do anything. The brain may be injured in its vision quarter, the nerve of the eye may be pressed upon or torn, the curtain at the back of the eye may be starved of blood or poisoned, the lens of the eye may be opaque instead of transparent, and so on. In such cases no spectacles are of any use. All they can do is simply to bend the rays of light passing through, in such a way that the rays fall rightly upon the curtain at the back of the eye.

It is often expected that spectacles will make people keen-sighted, but that is quite a mistake. One man with eyes quite healthy and sound, but perhaps needing spectacles, may get a pair which suit him perfectly; but he may still be quite unable to make out things at a distance which another man may see quite clearly, with or without spectacles.

Glasses may either bend rays of light inward toward each other, so that they come to a point sooner than they would otherwise have done, or they may bend the rays rather away from each other—or, at least, make them come to a point much later than they would otherwise have done. The rays are all wanted to come together at the retina; so, if the eye is too short, converging lenses, shaped like a burning-glass, are wanted, while concave, or hollowed-out, lenses are needed if the eyeball is too long.

Then, if the eyeball is so shaped that it does not treat rays the same way from side to side as up and down, we require a sort of barrel or cylinder-shaped lens, curved much more in one direction than in the other. When lenses are put together, one in front of the other, we have microscopes and telescopes. But, even with the largest telescope, differences in natural keenness of eye remain, and one man will discover comet after comet where another will be unable to see anything.

CAN A MACHINE BE MADE TO COUNT?

Yes, calculating machines "count." They have no voice with which to say aloud "one, two, three, four, five," but they count for us when we press certain levers. Figures are made on cylinders or discs, which are driven by various toothed wheels. These discs are so connected that, when one disc is caused to turn ten spaces, the disc next to it turns one space. This serves for a sum in adding up. For subtraction, the discs revolve in the opposite direction. But that is simple work which any child can do. The calculating machine also multiplies and divides, extracts the square root, and works out the most difficult sums. Men may make mistakes; but these machines, provided that they are in order, cannot make mistakes. They are so accurate that they are trusted more than men. All our most important astronomical and mathematical tables are worked out by these wonderful machines which man makes to be more accurate than he himself can ever hope to be. The machines are used in all the big insurance and large business offices. Early in the nineteenth century, Charles Babbage, a great mathematician, gave thirty years of his life to making a calculating machine, but it was not a success. The best machine in use today not only adds, subtracts, and divides, and shows the correct result, but actually prints the whole sum.

DO WE ALWAYS SEE EVERYTHING THE MOMENT IT HAPPENS?

On the contrary, we never see anything the moment it happens. Seeing is a very quick process, but yet it takes time. In the first place, when we see anything happen, the light from the objects we are looking at has to travel through space to reach our eyes. Now, light travels about 186,000 miles in a second, so when we are looking at something near at hand, or at anything on the earth, the time spent in this way is such a very tiny part of a second that we cannot imagine it.

But the stars are very distant, and lately astronomers saw something in the sky, certainly not the moment it happened, for they reckon that it must really have happened when James I. was on the throne of England. But this is not all. When the light reaches the eye, and passes through the front of the eye and reaches the nerve-cells in the retina, or curtain at the back of the eye, something which we can only call a nerve-current travels along the nerve of the eye to the brain, and through the substance of the brain to its very backmost part, where we really see things.

A nerve-current travels at about the rate of an express train—say, fifty to sixty miles an hour; so we may reckon how long it takes to travel some six inches or so, from the eye to the seeing centre in the brain. Lastly, the cells in the brain do their share, which takes more time than all the rest put together, and when that is done—we see.

WHY DO WE NOT GROW BIG ALL AT ONCE?

It is not in the nature of any living creature to be born full-grown. There is always a period of what is called development. In the case of the very humblest animals and plants, such as microbes, this is so short as to be scarcely worth mentioning; whereas, as life ascends, the period of development gets longer and longer.

All development is itself a miracle, and no less than if it really occurred all at once. We are beginning now to understand the reasons why it takes such a particularly long time for human beings to grow big. The fact which most distinguishes our growing is the growth of the brain. This comes first, so that the development of the brain is always ahead of the rest of the body; and it has to be so for the very good reason that the growth and health of the rest of the body so largely depend upon the brain, which therefore has to lead the way. That is why a new-born baby's head is so huge compared with the rest of its body. But though the brain is the first to begin and always leads the way, it is very interesting to know that the brain is not the first to stop.

On the contrary, when all the bones have stopped growing, so that we shall never be any taller, and when the rest of the body is fully developed, say, at twenty-seven or twenty-eight, the brain is still developing, though it may not be actually growing bigger in size; and it is not until many years later that a healthy man, who leads a sensible life, reaches the height of his mental powers. Most of the great works of thought that have made the history of the deepest kinds of knowledge have been written by men fifty years old or more.

WHERE IS THE WHITE MAN'S GRAVE?

This is the name which was very rightly given in the old days to part of the coast of West Africa, when white men first went there for the riches of the district and found that those who stayed for only a short time nearly all died or came to death's door. The great cause of this was the fever called malaria. In the course of long ages, the chemistry of the bodies of the natives of a malarial district, such as the White Man's Grave, has become changed, so that they can resist the poison of malaria. The poison enters practically every one of them when they are tiny children, but it does them comparatively little harm. The white man, however, is a very easy prey, and is struck down almost at once.

WHAT CAUSES MALARIA?

The name malaria means "bad air," and people thought that the poison must be in the air which was breathed in these places. But within the last fifteen years it has been found that malaria is due to a tiny living creature which is put into a person's blood by a certain kind of mosquito when it bites him. And now, in all parts of the world where the people have enough sense, this mosquito is being attacked, and people are taking care not to be bitten even by the mosquitoes that remain. Already the West African coast no longer deserves its old name of the White Man's Grave, and those who know tell us that before very long it may even become a favourite health resort for the white man!

WHY DOES AN APPLE TURN BROWN IF WE BITE IT AND PUT IT ASIDE?

This is one of many similar instances. We notice that the same sort of thing happens to some kinds of meat. When we cut a slice, the surface left is at first pale, but before very long it turns quite a dark brown. Now, we know that when various metals are left exposed to the air, their surfaces change colour. This is true, for instance, of iron; and we say that the iron rusts. The easiest way to understand the change in an apple is to say that it rusts. That, I believe, is more than a mere comparison. The change in colour is certainly due to a true oxidation; something in the apple combines with the oxygen in the air, and the change of colour is produced. Now, it is quite probable that it is the iron in the apple which is responsible for this quick oxidation, and for the change of colour which is produced by it. The colour of the apple after the surface has been oxidised quite suggests the colour of oxidised iron, and it is the case that probably all the colours of all kinds in all living things are due to the iron they contain. Chemists know how rich and various are the colours of the compounds of iron—brilliant red, the most intense blue, vivid green, and so on, and these colours suggest to us the cause of the colours of life in all its forms.

WHY DO FLOWERS DROOP IN A HEATED ROOM?

The shape and the balance of a flower very largely depend upon the water it contains. This is no doubt due in some degree to the mere presence of the water in itself. In a heated room the air, because it is heated, can hold a good deal of moisture. This means that the water rapidly leaves the flower through every part of its surface, and so the flower is dried up, withers, and droops. This will happen much less rapidly, of course, if the stalk of the flower is placed in water which it can suck up to some extent to make up for its rapid loss of water to the air.

But there can be little doubt that more than the question of water itself is concerned. All life is lived in water, and the very life of the flower is interfered with directly the supply of water falls short. Yet, again, a flower is meant to live in the open air. Such a flower as a rose, or any other flower that grows in the open air in this country, has its fibres and tissues so put together that they shall be stiff enough at the ordinary temperature of the open air. But the fibres which were stiff enough at such a temperature, may not be stiff enough when the flower is heated, for just the same kind of reason as that which makes sealing-wax soften when it is heated.

WHAT IS THE ADVANTAGE OF THE METRIC SYSTEM?

The advantages of the metric system are almost endless. They are so great that the metric system is used all over the world by men of science of all kinds; it is used in business in most parts of the world now, and every year it is being more generally used. All the measures in it are tens or tenths of the measures next to them. Instead of having 12 inches 1 foot, 3 feet 1 yard, 1,760 yards one mile, and so on, we have all the measures in the metric system going by tens.

This means that every kind of reckoning is made very simple because, in order to reduce one measure to another, it is merely necessary to move a decimal point along in one direction or the other. The huge labour of multiplying and dividing, made necessary by other measures, is all done away with.

Still more important is it that under the metric system all the different kinds of measures are related. In other systems, measures of length and of weight and of bulk, for instance, are all quite different; no measure of one of these kinds has anything particular to do with any other, and so there is more confusion than ever.

But in the metric system all these different kinds of measures are related, so that it is the easiest thing in the world to reckon the relation between bulk and weight, length and capacity. Then, again, the metric system agrees with the best method of measuring heat, which also goes by decimals. The time will have to come, and that before very long, when the metric system will be used all over the world, and will also be applied to coinage and money in general, to the great advantage of children who have to learn arithmetic.

WHY DO WE PRESS HARD ON DOWN STROKES WHEN WRITING?

One reason for this is the way in which pens are made. Whether we use a quill or a metal pen, it is so made that it runs more freely, if pressed, coming downward than it does going upward, for when it goes upward, if pressed, the point is apt to stick in the paper. That, however, is certainly not the whole reason. Even when we use a pen that has a turned-up point, or when we use a pencil, we find that we tend rather to press coming downward. This remains true even if we make the experiment of writing with the top end of the pencil turned away from us, instead of turned toward us. There is no doubt that the real reason is to be found in the way in which our hands are made.

The muscles that bend our fingers are vastly stronger than those that unbend them. Bending them is, of course, the important thing that requires strength, because it is by bending the fingers that we hold and grasp. The muscles that unbend are, comparatively, very feeble, just as the muscles that open the mouth are feeble compared with those that close it. So we naturally use more force on the strokes we make with the closing than with the unclosing muscles.

IS A LIGHTED CANDLE IN FRONT OF A MIRROR EQUAL TO TWO CANDLES?

There is no doubt that when we put a candle in front of a looking-glass we seem to see two candles, and there is also no doubt that both from the real candle and from the reflected candle real light comes. If we have two glasses opposite each other, or if we have a light in a room with a number of mirrors, it seems as if we could multiply the light almost to any extent.

This has puzzled many people, for something tells us that we cannot get something out of nothing, and yet it looks in this case as if from one candle we were really somehow getting the light of two candles, or of many more. But what really happens is that we are getting proper value for the light of one candle.

The difference is tremendous if we take a candle and put it into a room with black walls, and then take the same candle and put it into a room the walls of which are lined with mirrors. In one case a great proportion of the light is absorbed, or sucked up, by the walls; in the other practically the whole of it is thrown back, and sooner or later reaches our eyes.

If people understood this better, they would realise what good economy it is to have their rooms covered with some surface that is very light in colour, and at the same time can be washed. It is good economy because far less light is needed to light such a room, the walls of which throw back nearly all the light in the room instead of sucking it up.

WHY DOES A BUMP COME INSTEAD OF A DENT WHEN WE KNOCK OUR HEADS?

It is quite possible to make a dent in the skull, or in a bone, just as in a table, but the blow would have to be hard, and would have to be made by something with a sharp edge, and even then the dent would not last long, but would soon be filled up, and much more than filled up, for a bump would be formed. The reasons why this bump is formed are very interesting.

When we have knocked our head, we have done a certain amount of damage at the place, and what happens there is what happens at any part of the body that has been damaged. The same is true whether the damage is due to a blow, or to a cut, or to a sting, or to the presence of microbes.

Everything that makes the bump is due to the body's effort to repair the damage; and so we are to look on the bump as natural "doctoring," which is what it really is. The blood-vessels in the affected part enlarge, so that a quantity of blood goes there. Certain of the fluids of the blood soak through the walls of the blood-vessels, while numbers of white blood-cells pass through the walls also, and the swelling is due to the extra amount of fluid and to this vast congregation of cells that assemble in the place.

They are all there for a purpose; they bring materials from which new things can be made to replace and repair anything that has been damaged or broken. If microbes are there, the fluids include substances which are poisonous to microbes, and the white cells eat the microbes up, and the part is made well again.

WHAT MAKES A HEADACHE?

A whole book could be written about headache, for it has so many causes. *The commonest of all is decayed teeth;* but not even every doctor knows this.

The nerve that supplies the forehead and the front part of the scalp is the same as the nerve that sends branches to the jaws and teeth; and when one part of it is disturbed, the other is apt to give us trouble too. So when any of us have constant headaches we must be sure to attend to any decayed teeth that we may have.

Another very common cause of headache is strain of the eyes in reading. This does not happen to those few and fortunate people whose eyes are of exactly the right shape and size, nor does it happen to short-sighted people; but it constantly happens to those whose eyes are what we call long-sighted. They can see clearly at long distances, but for sight at short distances, as in reading and writing, they need to strain the eye in order to see the letters clearly, and this strain almost always gives rise to headache. The remedy is to use glasses that do the excessive work imposed upon the muscles inside the eye, and so relieve the strain and the consequent headache.

ARE HEADACHE POWDERS GOOD THINGS?

Everyone should know that the answer to this is, No—a thousand times, No. There is no headache powder anywhere that does anything to remove the cause of any headache. Headache powders only dull the brain so that we cannot feel the pain, and so very often persuade us to give up attending to ourselves, as we should do if the pain were still there. The powder does nothing for the decayed teeth, or the strained eyes, or the overloaded stomach, that may be the real cause of the trouble.

These powders are all poisons, and people have often been killed by them. It is very wrong that men should be able to sell these things. People get into such a condition that they cannot do without them, and they gradually injure their brains and their minds, and do harm much greater than that which they seem to relieve in curing the headache.

WHAT MAKES A SICK-HEADACHE?

In the answer to the previous questions, we have read about three of the many causes of headache; but this question is about a quite special kind of headache that has nothing to do with the teeth or eyes, and makes us much more miserable than an ordinary headache does. The pain may not be so great, but we are more unhappy, because we feel bad *all over*, and not only in the head. When we feel bad *all over*, the reason is almost always to be found somewhere inside the trunk of the body, and, nine times out of ten, in the stomach or its neighbourhood.

In other words, this is a kind of headache that suggests to the doctor, not teeth or eyes, but indigestion. People who never have indigestion never have these horrible sick-headaches. The best way to avoid them is to be careful and sensible about what we eat; and the best way to cure them is to believe that Nature is wise in making an appetite disappear for a little. If we stop eating, and so give the stomach time to recover, and if we take some simple salts, or something of the kind, to clear away what is poisoning the blood and the brain, we shall soon be well.

WHERE DOES THE WOOL GO WHEN WE GET HOLES IN OUR STOCKINGS?

This question really and rightly assumes the answer to another question: Does the wool go to nowhere? The answer to that question is No, for we know that it is impossible for anything to go nowhere.

Now, we can find out what happens to the wool by asking how this hole in the stocking is made. Holes do not come in stockings as long as they lie in drawers unused. It is when and where a stocking is rubbed that the holes come. After a lot of walking that wears a hole in a stocking, we could find traces of wool on the skin and inside the boot if we were to look with a microscope.

WHAT WERE THE "HUNGRY FORTIES"?

In the early forties of the nineteenth century, that is, from 1840 onward, very shortly after Queen Victoria came to the throne, bread was very dear. Now, bread has the virtue, none too common in this world, of combining great goodness with great cheapness, and therefore it has always been the principal food—the staple food, as we call it—of the poor wherever it has been obtainable. This was so, for instance, in great empires of the past, such as Egypt and Rome, and it is true of England. In the years round about 1840 bread cost, indeed, often twice as much as it does to-day, and the poor suffered terribly from hunger. A famous little book dealt with the subject of these days, and the author gave it the striking name of "The Hungry Forties."

WHY IS BREAD CALLED "THE STAFF OF LIFE"?

This is a very old name for bread, and, unlike many such old names, it is a very good one. Spirits used long ago to be called the "water of life," or, in Latin, *aqua vitæ*, but everyone knows now, or should know, that if they are to have any name of the kind, it should be *aqua mortis*, water of death. The old name, however, was hastily given to spirits by those who first found how to distil alcohol, and who naturally wanted to make the most of their discovery.

The belief that bread is a very good food, which is what men mean when they call it "the staff of life," is very old indeed. It must doubtless date back to the remote ages when men first grew corn for the purpose of making bread, and our reading in the Old Testament about the famine of corn in Egypt in the time of Joseph will give us some idea of the high honour in which corn was held a very long time ago.

WHY IS BREAD SUCH A VALUABLE FOOD?

It is only in the last few years that men have learnt how to study all kinds of food, and find out exactly how good they are, and in what way they are good, for the human body. This has been done, many times over and in many different ways, for thousands of foods and drugs, and certain very important facts have already been firmly established. We are still in much doubt as to the exact value of meat and of many other foods; but everyone who has any right to an opinion is agreed as to the value of bread. Milk is the staff of life in our earliest years, and nothing else can replace it. But, though no other one food is as all-important in later years as milk is at first, bread is superior to everything else in its food value, and its cheapness and its freedom from anything that injures the body. Therefore, it cannot be too cheap

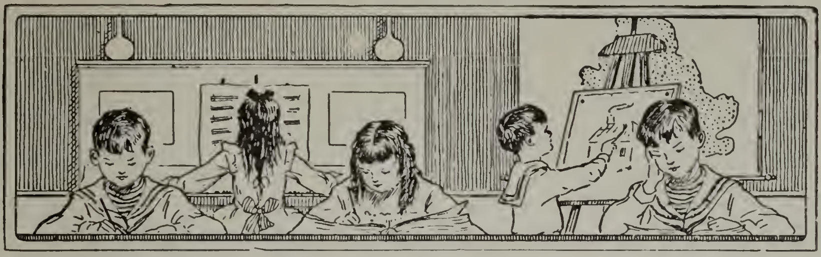
WHY HAVE SOME PEOPLE MORE BEAUTIFUL VOICES THAN OTHERS?

If anyone has something the matter with the little cords in his throat that make his voice, it will be harsh or husky. A drunkard has usually injured his vocal cords, and so his voice is usually husky. But if people's vocal cords are quite well they are very like each other; and the difference between beautiful voices and ordinary voices has *nothing at all to do* with the vocal cords. The vocal cords of the most beautiful singer, if we could hear the sound they make by themselves, away from the rest of the throat, would disappoint us very much. The sound made by the vocal cords is always harsh and ugly. The beautiful singer is one who, firstly, has his throat and nose and mouth of exactly such shapes that they change the sound made by his cords into a pleasant sound. Secondly, he is a person who has learnt how to move the muscles of his throat and tongue and cheeks so as to make the sound as beautiful as possible. No one can make uglier sounds than a good singer, if he really wants to, for he is so clever in controlling these muscles.

WHY DO SOME PEOPLE SPEAK MUSICALLY AND OTHERS HARSHLY?

It is thought that the chief difference between people who speak in a beautiful voice and people who speak in an ugly voice is a difference not in the vocal cords, or yet in the throat, nor even in skill in using the muscles used in speech or singing; but it is a difference *in the brain*. People who have delicate ears—which means people whose brains, in the part which hears, are beautifully and finely made—will produce the kind of sound their brain likes, at any rate so far as they can; and almost anyone can speak, or even sing a few soft notes, in beautiful tones, *if they try*. But if our brain is coarsely made, and does not know or care about the difference between beautiful tones and ugly ones, then we shall just make the sounds that carry farthest, or take the least trouble to make, however ugly they are.

THE NEXT BOOK OF WONDER IS ON PAGE 5650.



READING

THE MEANING OF COMMON ABBREVIATIONS

In our reading we often see contractions, or initial letters, which we know stand for something. We may not know what they stand for, and, consequently, miss their meaning. On this and the following pages are given the contractions that we come across most frequently in our reading.

A1. The principal use of this expression is for ships. At Lloyd's a ship that is classed as A1 is a ship that is almost new or is as good as new. The A refers to the quality of the hull, and the 1 to the anchors, cables, and stores. The expression has now come to be used for anything that is very good. If we say that we feel A1, we mean that we feel in the very best of health.

A.B. Able-bodied seaman—a sailor who is no longer an apprentice, and is not an officer.

A.B. Bachelor of Arts.

A.D. In the Year of Our Lord. Taken from the Latin words *Anno Domini*. Our system of numbering the years is the Anno Domini system, and 1910 A.D. means the year 1910, reckoning the year of Christ's birth as 1.

Ad. or Advt. Advertisement.

A.D.C. Aide-de-camp, an army officer who carries orders to and from a general on the field of battle.

Æ. or æt. Aged, from the Latin word *ætatis*, meaning of the age. Charles Jones, æt. ten years, means Charles Jones, ten years of age.

A.H. The Mohammedans reckon their years from the Hegira, or the flight of Mohammed from Mecca to Medina, in 622 A.D. The letters stand for *Anno Hegiræ*. Latin word *anno*, meaning "in the year," and the Arabic word for "flight." When the Mohammedans speak of the year 1287 A.H., they mean the same year as we do when we speak of 1909 A.D.

Ala. Alabama, one of the states of U.S.A.

Ald. Alderman.

A.M. Before noon. The letters represent the Latin words *ante meridiem*.

A.M. In the year of the world. The letters represent the Latin words *anno mundi*. The Jews reckon the years from the time the world was supposed to have been created, which was 3760 B.C. The Jewish year 5669 A.M. is the same as 1909 A.D., but the Jewish year begins on September 26 instead of on the following January 1.

A.M. Master of Arts, from the Latin words *artium magister*. See M.A.

Anon. Anonymous.

A.O.F. Ancient Order of Foresters.

App. Appendix.

A.R.A. Associate of the Royal Academy.

Ariz. Arizona, one of the states of U.S.A.

Ark. Arkansas, one of the states of U.S.A.

A.R.S.A. Associate of the Royal Scottish Academy or Associate of the Royal Society of Arts.

A.R.S.L. Associate of the Royal Society of Literature.

A.R.S.S. Fellow of the Royal Society of Antiquaries. The letters stand for the Latin words *Antiquariorum Regiæ Societatis Socius*.

A.V. Authorised version of the Bible.

B.A. Bachelor of Arts. The letters stand for the Latin words *Baccalaureus Artium*

B.C. Before Christ. The years before Christ are reckoned backwards, so that the year 1 B.C. was one year before the birth of Christ, and the year 200 B.C. was 200 years before the birth of Christ.

B.C.L. Bachelor of Civil Law.

B.D. Bachelor of Divinity.

B.L. Bachelor of Law.

b.l. Bill of Lading.

B.M. Bachelor of Medicine. The letters are also used to mean British Museum.

B. Mus. Bachelor of Music.

B. Sc. Bachelor of Science. The letters stand for the Latin words *Scientiæ Baccalaureus*.

Bt. or Bart. Baronet.

bu. Bushel.

bx. box.

C. The Roman numeral for 100, from the Latin *centum*, a hundred.

C. Centigrade. The markings on the French or decimal thermometer. It is so called from the Latin *centum*, a hundred, and *gradus*, a step, because from freezing to boiling point is divided into 100 degrees. The American system of thermometer marking is the Fahrenheit, which is usually written F. or Fahr. It is so called after Fahrenheit, the scientist who invented it.

C. Centime. A French coin, five of which are about equal to one cent.

ca. About. Latin *circa*.

Cal. California, one of the states of U.S.A.

Cap. Chapter, from the Latin *caput*, the head.

C.B. Companion of the Order of the Bath.

C.B. Confined to barracks.

C.B. Cape Breton, a part of Nova Scotia in Canada.

C.C.N.Y. College of the City of New York.

C.D.S.O. Companion of the Distinguished Service Order.

c d.v. Carte-de-visite.

C.E. Civil Engineer, Christian Endeavour, or Children's Encyclopædia.

Cf. A contraction of "confer" and used in the sense of *compare*. In bookbinding cf. means calf.

C.F.I. A commercial expression meaning cost, freight, and insurance.

C.G. Captain-general, commissary-general, consul-general, coastguard, or captain of the guard.

Ch. Chapter.

Chic. Chicago.

C.J. Chief Justice.

C.I.E. Companion of the Order of the Indian Empire.

C.M. Master of Surgery. The letters stand for the Latin words *Chirurgiæ Magister*.

Cm. Centimetre, the French measurement.

C.M.G. Companion of the Order of St. Michael and St. George.

C.O. Commanding Officer.

C/o. Care of.

c.o.d. Cash on delivery.

Colo. Colorado, one of the states of U.S.A.

Conn. Connecticut, one of the states of U.S.A.

C.O.S. Charity Organisation Society.

C.P. Court of Probate.

Cr. Credit or creditor.

C.S. Chemical Society.

C.S. Civil Service.

C.S.A. Confederate States of America.

C.S.N. Confederate States Navy.

C., or ct. Cent.

C.V.O. Commander of the Royal Victorian Order.

C.W.O. Cash with order.

cwt. Hundredweight, from c. for *centum*, a hundred, and wt. for weight.

d. Penny or pence. 2d. means two pence, and 1d. means one penny. The d. is for the Latin word *denarius*.

D.C. Repeat from the beginning. A contraction used in music, and standing for the Italian words *Da capo*. Also district of Columbia, in which is Washington, the capital of U.S.A.

D.C.L. Doctor of Civil Law.

D.D. Doctor of Divinity. The letters stand for the Latin words *Divinitatis Doctor*.

Del. Delaware, one of the states of U.S.A.

D.G. By the grace of God. The letters stand for the Latin words *Dei gratia*.

D.L. Deputy Lieutenant.

D.Lit. Doctor of Literature.

D.L.O. Dead Letter Office.

Dr. Doctor or debtor.

dr. Dram.

D.Sc. Doctor of Science. The letters stand for the Latin words *Doctor Scientiæ*.

D.S.O. Distinguished Service Order.

D.V. The letters stand for the two Latin words *Deo Volente*, meaning God willing.

dwt. Pennyweight. d. stands for the Latin word *denarius*, and wt. is a contraction for weight.

E. East.

E. & O.E. Errors and omissions excepted.

E.C. East Central, a London postal district.

Ed. Editor, or sometimes edition.

e.g. For example. The letters stand for two Latin words *exempli gratiâ*.

E.N.E. East-north-east—the point of the compass midway between the east and the north-east.

Eng. Engineer; Engineering; England; English.

E.R.I. Edward, King and Emperor, standing for the Latin words *Eduardus, Rex et Imperator*.

E.S.E. East-south-east, the point of the compass midway between east and south-east.

etc. Etcetera, meaning and others.

Ex-. Formerly.

F. or Fahr. The measurements of the Fahrenheit thermometer.

f. Farthing, florin, franc, foot, or fathom.

F.A.S. Fellow of the Society of Arts or Fellow of the Antiquarian Society.

F.B.S. Fellow of the Botanical Society.

fcp. Foolscap, a size of paper.

F.C.S. Fellow of the Chemical Society.

F.D. or Fid. Def. Defender of the Faith, from the Latin words *Fidei defensor*.

F.G.S. Fellow of the Geological Society.

fl. Florin.

Fla. Florida, one of the states of U.S.A.

F.L.S. Fellow of the Linnæan Society.

F.-M. Field-marshal.

fm. Fathom.

f.o.b. Free on board. A commercial term.

F.P. Fire plug, frequently seen on walls, indicating that there is a fire plug near that spot.

fr. Franc, the French coin.

F.R.A.S. Fellow of the Royal Astronomical Society or Fellow of the Royal Asiatic Society.

F.R.C.P. Fellow of the Royal College of Physicians.

F.R.C.S. Fellow of the Royal College of Surgeons.

F.R.G.S. Fellow of the Royal Geographical Society.

F.R.H.S. Fellow of the Royal Horticultural Society.

F.R.I.B.A. Fellow of the Royal Institute of British Architects.

F.R. Met. S. Fellow of the Royal Meteorological Society.

F.R.S. Fellow of the Royal Society.

F.R.S.L. Fellow of the Royal Society of Literature.

F.S.A. Fellow of the Society of Arts or Fellow of the Society of Antiquaries.

F.S.S. Fellow of the Statistical Society.

ft. Foot, feet, or fort.

F.Z.S. Fellow of the Zoological Society.

G. or gm. Gramme, the French weight.

Ga. Georgia, one of the states of U.S.A.

G.B. Great Britain.

G.C.B. Knight Grand Cross of the Order of the Bath.

G.C.H. Knight Grand Cross of Hanover.

G.C.I.E. Knight Grand Commander of the Order of the Indian Empire.

G.C.L.H. Grand Cross of the Legion of Honour.

g.c.m. Greatest common measure.

G.C.M.G. Knight Grand Cross of the Order of St. Michael and St. George.

G.C.S.I. Knight Grand Commander of the Order of the Star of India.

G.C.V.O. Knight Grand Cross of the Royal Victorian Order.

G.F.S. Girls' Friendly Society.

gm. Gramme

G.M. Grand Master of Masons.

G.O.M. Grand Old Man, a term applied to the late Mr. Gladstone.

G.P.O. General Post Office.

gr. Grain.

gs. Guineas.

gu. Guinea.

H.B.M. His or Her Britannic Majesty.

H.C.M. His or Her Catholic Majesty.

H.G. Horse Guards or His Grace.

H.H. His or Her Highness.

H.I.H. His or Her Imperial Highness.

H.M. His or Her Majesty.

H.M.C. His or Her Majesty's Customs.

H.M.I.S. His or Her Majesty's Inspector of Schools.

H.M.S. His or Her Majesty's Ship. His or Her Majesty's Service.

H.P. Half pay.

h.p. Horse power.

H.R. H'se of Representatives

H.R.E. Holy Roman Emperor or Holy Roman Empire.

H.R.H. His or Her Royal Highness.

H.R.I.P. Here rests in peace. The letters stand for the Latin words *Hic requiescat in pace.*

H.S.H. His or Her Serene Highness.

H.S.S. Fellow of the Historical Society. The letters stand for the Latin words *Historiæ Societatis Socius.*

I. Idaho, one of the states of U.S.A.

Ia. Iowa, one of the states of U.S.A.

Ib. or Ibid. In the same place, standing for the Latin word *Ibidem.*

I.C.E. Institute of Civil Engineers.

I.C.S. Indian Civil Service.

Ida. Idaho, one of the states of U.S.A.

I.D.B. Illicit diamond buying.

i.e. That is. The letters stand for the Latin words *id est.*

I.H.S. Jesus, from the first three letters of the name when written in Greek capitals. It is sometimes erroneously supposed to stand for *Jesus Hominum Salvator*, three Latin words meaning Jesus, Saviour of men.

Ill. or Ills. Illinois, one of the states of U.S.A.

I.L.P. Independent Labour Party.

I.M.S. Indian Medical Service.

in. Inch or inches.

I.N.D. In the Name of God, standing for the Latin words *In Nomine Dei.*

Ind. Indiana, one of the states of U.S.A.

Ind. T. Indian Territory, a former district in U.S.A.

I.N.R.I. Jesus of Nazareth, King of the Jews. The letters stand for the Latin words *Iesus Nazarenus Rex Judæorum*, which were written above the Cross. J and I are the same letters in Latin.

Io Iowa, one of the states of U.S.A.

I.O.F. Independent Order of Foresters.

I.O.G.T. Independent Order of Good Templars.

I.O.U. I owe you.

I.R. Internal Revenue.

J.H.S. The same as I.H.S.

J.P. Justice of the Peace.

Jr. or Jun. Junior.

J.U.D. Doctor of Canon and of Civil Law. The letters stand for the Latin words *Juris Utriusque Doctor.*

Kan., Kans. Kansas, one of the states of U.S.A.

K.B. Knight of the Bath or King's Bench.

K.C. King's Counsel.

K.C.B. Knight Commander of the Order of the Bath.

K.C.H. Knight Commander of the Order of Hanover.

K.C.I.E. Knight Commander of the Order of the Indian Empire.

K.C.M.G. Knight Commander of the Order of St. Michael and St. George.

K.C.S.I. Knight Commander of the Order of the Star of India.

K. C. V. O. Knight Commander of the Victorian Order.

Ken. or Ky. Kentucky, one of the states of U.S.A.

Kg. Kilogramme, the French weight.

K.G. Knight of the Garter.

K.G.C. Knight of the Grand Cross.

K.G.C.B. Knight of the Grand Cross of the Bath.

K.G.F. Knight of the Golden Fleece.

K.H. Knight of the Order of Hanover.

K.L.H. Knight of the Legion of Honour.

Km. Kilometre, the French measure, equal to ⅝ mile.

Knt. or Kt. Knight.

K.P. Knight of the Order of St. Patrick. Knight of Pythias.

K.S.I. Knight of the Order of the Star of India.

K.T. Knight of the Order of the Thistle. Knight Templar

Kt. Bach. Knight Bachelor.

Ky. Kentucky, one of the states of U.S.A.

L. Lake, Book, Latin *liber.*

l. Latitude.

lb. Pound or pounds, from the Latin word *libra*, meaning a pound.

l.b.w. Leg before wicket.

l.c. Lower-case.

L.C.B. Lord Chief-baron.

L.C.C. London County Council.

l.c.m. Least common multiple.

Leip. Leipsic, a city in Germany.

£E. Egyptian pound, which is equal to 20/6¼.

L.I. Light Infantry.

Lieut. Lieutenant.

Lim. or Ltd. Limited.

LL.B. Bachelor of Laws. The letters stand for the Latin words *Legum Baccalaureus.*

LL.D. Doctor of Laws. The letters stand for the Latin words *Legum Doctor.*

Lou. Louisiana, one of the states of U.S.A.

L.R.C.P. Licentiate of the Royal College of Physicians.

L.R.C.S. Licentiate of the Royal College of Surgeons.

L.S. Linnæan Society.

L.S.A. Licentiate of the Society of Apothecaries.

L.s.d. Pounds, shillings, and pence, from the Latin *libræ, solidi, denarii.*

Lt. or Lieut. Lieutenant.

£T. Turkish pound=18s.

M. 1,000, from the Latin *mille*, a thousand.

M. or Mons. Short for Monsieur, the French word for Mr.

M.A. Master of Arts.

Mass. Massachusetts, one of the states of U.S.A.

M.B. Bachelor of Medicine. The letters stand for the Latin words *Medicinæ Baccalaureus.*

M.C Member of Congress

Md. Maryland, one of the states of U.S.A.

M.D. Doctor of Medicine. The letters stand for the Latin words *Medicinæ Doctor.*

Mdlle. or Mlle. The French for Miss, being a contraction of *Mademoiselle.*

Mdm. or Mme. Madam.

Me. Maine.

M.E. Mining Engineer. Methodist Episcopal.

M.F.H. Master of Fox Hounds.

mg. milligramme.

M.I.C.E. or M.Inst.C.E. Member of the Institute of Civil Engineers.

Mich. Michigan, one of the states of U.S.A.

Minn. Minnesota, one of the states of U.S.A.

Mis. Missouri, one of the states of U.S.A.

Miss. Mississippi, one of the states of U.S.A.

Mlle. *See* Mdlle.

MM. Short for Messieurs, the plural of Monsieur.

M.M. Their Majesties.

Mo. Missouri, one of the states of U.S.A.

Mont. Montana, one of the states of U.S.A.

M.P. Member of Parliament.

M.P.S. Member of the Philological or of the Pharmaceutical Society.

Mr. Master or Mister.

M.R.A.S. Member of the Royal Academy of Sciences or of the Royal Asiatic Society.

M.R.C.C. Member of the Royal College of Chemistry.

M.R.C.S. Member of the Royal College of Surgeons.

M.R.C.V.S. Member of the Royal College of Veterinary Surgeons.

M.R.G.S. Member of the Royal Geographical Society.

M.R.I. Member of the Royal Institution.

M.R.I.A. Member of the Royal Irish Academy.

Mrs. Mistress.

MS. Manuscript. The plural is MSS.

M.S. Master of Science.

m.s.l. Mean sea-level.

M.S.S. Member of the Statistical Society.

Mus.B. Bachelor of Music.

Mus.D. Doctor of Music.

N. North.

N.A. North America; also National Academy.

N.B. Note well. The letters stand for the Latin words *Nota bene.* Also refers to North Britain, or Scotland, and to New Brunswick.

N.C. North Carolina, one of the states of U.S.A.

N.C.O. Non-Commissioned Officer.

N. Dak. North Dakota, one of the states of U.S.A.

N.E. North-east or New England.

Neb. or Nebr. Nebraska, one of the states of U.S.A.

Nev. Nevada, one of the states of U.S.A.

N.F. Newfoundland.

N.H. New Hampshire, one of the states of U.S.A.

N.J. New Jersey, one of the states of U.S.A.

N.N.E. North-north-east, the point in the compass midway between north and north-east.

N.N.W. North-north-west, the point in the compass midway between north and north-west.

No. Number. It is short for the Latin word *Numero.*

n.o.p. Not otherwise provided.

N.P. Notary public.

N.S. New style. See O.S.

N.S. Nova Scotia.

N.S.P.C.C. National Society for the Prevention of Cruelty to Children.

N.W. North-west.

N.W.T. North West Territories, in Canada.

N.Y. New York, one of the states of U.S.A.

O. Ohio, one of the states of U.S.A.

Ob. Died, standing for the Latin *Obiit.*

O.E. Old English.

O.F. Odd Fellow.

O.H.M.S. On His or Her Majesty's Service. Ohms as a word means certain units used in electricity, so called from Professor Ohm.

O.K. All correct, from the American term Orl Korrect.

Ont. Ontario, a province of Canada.

%. Per cent.

O.R.C. Orange River Colony.

Ore. or Oreg. Oregon, one of the states of U.S.A.

O.S. Old style, referring to the Calendar before its change in Queen Anne's reign.

oz. Ounce. The z represents a curious character that was used in old manuscripts to denote an abbreviation.

p. Page; the plural form is pp.

Pa. Pennsylvania, one of the states of U.S.A.

P.C. Privy Councillor, police constable, or postcard.

P.E.I. Prince Edward Island.

Penn. Pennsylvania, one of the states of U.S.A.

Ph.B. Bachelor of Philosophy. The letters stand for the Latin words *Philosophiæ Baccalaureus.*

Ph.D. Doctor of Philosophy. The letters stand for the Latin words *Philosophiæ Doctor.*

P.M. Afternoon, standing for the Latin words *post meridiem*; postmaster or past-master. The letters also stand for *post mortem*, the examination of a dead body.

P.M.G. Postmaster-general.

P.O. Post office, patent office, or postal order.

P.O.D. Paid on delivery.

P.O.O. Post office order.

P.P. Parish Priest.

pp. Pages.

P.P.C. To take leave. The letters stand for the French words *pour prendre congé.*

P.P.S. Additional postscript, see P.S.

P.R.A. President of the Royal Academy.

P.R.I.B.A. President of the Royal Institute of British Architects.

P.R.S. President of the Royal Society.

P.S. Pharmaceutical Society or Philological Society.

P.S. Postscript—a part of a letter written after or below the signature of the writer, from the Latin *post scriptem.*

pt. Part, or pint.

pwt. Pennyweight.

Q.E. Which is. The letters stand for the Latin words *quod est.*

Q.E.D. Which was to be demonstrated. The letters stand for the Latin words *quod erat demonstrandum.*

Q.E.F. Which was to be done, standing for the Latin words *Quod erat faciendum.*
Q.M. Quartermaster.
Q.M.G. Quartermaster-general.
q.s. As much as will suffice. The letters stand for the Latin *quantum sufficit.*
q.v. Which see. The letters stand for the Latin words *quod vide.*
R. King or queen, from the Latin *Rex* or *Regina.*
R. Take, used in doctor's prescriptions, and standing for the Latin word *recipe.*
R.A. Royal Academy or Royal Artillery.
R.A.M. Royal Academy of Music.
R.A.S. Royal Asiatic Society.
R.C. Roman Catholic.
R.C.M. Royal College of Music.
R.C.S. Royal College of Surgeons.
Rev. Reverend ; also revise.
R.F. French Republic; for the French words *République Française.*
R.G.G. Royal Grenadier Guards.
R.G.S. Royal Geographical Society.
R.H. Royal Highness.
R. H. A. Royal Horse Artillery.
R.H.G. Royal Horse Guards.
R.H.S. Royal Humane Society, Royal Historical Society, or Royal Horticultural Society.
R.I. Rhode Island, one of the states of U.S.A.
R.I.B.A. Royal Institute of British Architects.
R.I.P. Rest in peace The letters stand for the Latin words *Requiescat in pace.*
R.M. Royal Mail or Royal Marines.
R.M.A. Royal Marine Artillery.
R.M.L.I. Royal Marine Light Infantry.
R.M.S. Railway Mail Service.
R.N. Royal Navy.
R.P.O. Railway Post Office.
R.R. Railroad.
R.S. Royal Society.
R.S.A. Royal Society of Antiquaries.
R.S.L. Royal Society of Literature.
R.S.M. Royal School of Mines.
R.S.O. Railway sub-office, a postal term.
R.S.P.C.A. Royal Society for the Prevention of Cruelty to Animals.
R.S.S. Fellow of the Royal Society. The letters stand for the Latin words *Regiæ Societatis Socius.* The letters S.R.S. are also used.
R.S.V.P. Reply, if you please. The letters stand for the French words *Répondez, s'il vous plaît.*
R.V. Rifle Volunteers or Revised Version (of the Bible).
S. Shillings—from the Latin *solidi ;* south, saint, or seconds.
S.A. South Africa.
S.A.S. Fellow of the Society of Antiquaries. The letters stand for the Latin words *Societatis Antiquariorum Socius.*
S.C. South Carolina, one of the states of U.S.A.
Sc.B. Bachelor of Science. The letters stand for the Latin words *Scientiæ Baccalaureus.*
Sc.D. Doctor of Science. The letters stand for the words *Scientiæ Doctor.*
s.d. Without day ; indefinitely ; a contraction for *sine die*, Latin.
S. Dak. South Dakota, one of the states of U.S.A.
S.E. South-east.
s.g. Specific gravity.
S.M. The French form of his or her Majesty, standing for the French words *Sa majesté.*
S.P.C.C. Society for the Prevention of Cruelty to Children.
S.P.G. Society for the Propagation of the Gospel.
S.P.Q.R. The Senate and People of Rome. The letters stand for the Latin words *Senatus Populusque Romanus.*
S.R.S. Fellow of the Royal Society. The letters stand for the Latin words *Societatis Regiæ Socius.*
SS. Steamship.
S.S.E. South-south-east—the point of the compass midway between south and south-east.
S.S.U. Sunday School Union.
S.S.W. South-south-west, the point of the compass midway between south and south-west.
St. Street, saint, or strait.
S.W. South-west or senior warden.
Tenn. Tennessee, one of the states of U.S.A.
Tex. Texas, one of the states of U.S.A.
T.R.H. Their Royal Highnesses.
T.S. Twin screw.
U.F.C. United Free Church of Scotland.
U.K. United Kingdom.
U. K. A. United Kingdom Alliance.
U.P. United Presbyterian.
U.S. United States, or United Service, *i.e.*, the Army and Navy.
U.S.A. United States of America.
U.S.M. United States Mail, or Marines.
V. Roman numeral for 5.
v. Against, standing for the Latin word *versus* ; or see, standing for the Latin word *vide.*
V.A. Royal Order of Victoria and Albert.
Va. Virginia, one of the states of U.S.A.
V.C. Victoria Cross, vice-chancellor, or vice-consul.
Verm. or Vt. Vermont, one of the states of U.S.A.
v.g. For example, standing for the Latin words *verbi gratia.*
V.P. Vice-president.
V.R. Queen Victoria, standing for the Latin words *Victoria Regina.*
V.R.I. Victoria, Queen and Empress, standing for the Latin words *Victoria Regina et Imperatrix.*
V.S. Veterinary Surgeon.
Vt. or Verm. Vermont, one of the states of U.S.A.
W. West.
Wash. Washington, one of the states of U.S.A.
W.C. West Central, a postal district in London.
W.C.T.U. Women's Christian Temperance Union.
Wis. or Wisc. Wisconsin, one of the states of U.S.A.
W.N.W. West-north-west, the point in the compass midway between west and north-west.
W.S.W. West-south-west, the point in the compass midway between west and south-west.
wt. Weight.
W. Va. West Virginia, one of the states of U.S.A.
Wyo. Wyoming, one of the states of U.S.A.
yd. Yard.
Y.M.C.A. Young Men's Christian Association.
Y.W.C.A. Young Women's Christian Association.

THE NEXT SCHOOL LESSONS BEGIN ON PAGE 5698

CONTINUED FROM PAGE 5644

WHY THINGS ARE DONE

WHY A HORSE FOLLOWS HIS MASTER'S FUNERAL

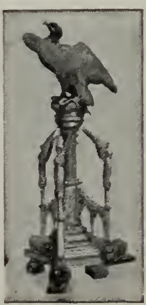
At the funeral of the late King Edward VII. his horse was led behind the coffin in the procession, and this practice is often followed at the funerals of cavalry officers. It is a very old custom, dating back to the times when men were more or less savage. When a dead warrior was buried, his favourite war horse was led in the funeral procession, so that it might be offered in sacrifice at the graveside, and the remains were either cremated or buried with those of his master.

WHY SAINTS ARE DRAWN WITH HALOS

Statues of gods, in ancient times, used to be decorated with a circlet of stars round the head, and Roman emperors, claiming to be equal with the gods, took to wearing a similar decoration. During the early days of the Christian Church, however, this sort of decoration was avoided in Christian art. Then someone thought of putting a broad circular brass plate round the heads of statues which were exposed to the weather, as protection against snow and rain. Later it became customary to employ the same device for statues indoors. Then, when men began to paint sacred pictures, they copied the decoration from statues.

WHY A LECTERN IS MADE LIKE AN EAGLE

Of many forms of heathen worship, the practice of regarding animals and birds as idols was one of the most common. The practice was world-wide at one time. Then the human mind improved. It was seen that these animals and birds which men worshipped were not worthy to be worshipped. Men came to worship what we call an abstract idea, but as an idea must have form and substance if it is to be perceived by the human senses, they chose certain forms of life to represent the ideas that they worshipped. Men chose birds and animals as representing various saints. The eagle was chosen as the emblem of St. John, and, as the image of an eagle made a handsome and convenient reading-desk, it became generally adopted in churches by people who, perhaps, had no idea that originally it stood for St. John.

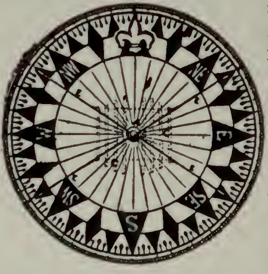


WHY THE KING HAS AN ORB AND SCEPTRE

These are emblems carried only at coronations or on other high State occasions. The orb used to be carried by the Roman emperors, and our Saxon kings borrowed the idea from Rome. The round orb, or globe of gold, carried by the emperors represented the whole world, of which, at the time, Rome was mistress. In those days the orb was crowned with a golden eagle. Constantine the Great first placed a cross at the top, and in that form we ourselves now use the orb. The sceptre is another old-time emblem. The king, in bygone days, used to have a spear to lean upon at high ceremonies. As the times grew more peaceful and polite, the spear disappeared, and a rod of gold was made to take its place.

WHY THE COMPASS HAS A FLEUR-DE-LYS

It is usual on the card of a mariner's compass to mark the north by a fleur-de-lys, which is French for flower of the lily. This has been the practice in Europe for six centuries. The reason that the fleur-de-lys came to be used for that purpose is that it was the heraldic badge of Charles of Anjou, the King of Naples at the time that Flavio Gioja, the Neapolitan mariner, improved the compass and made it practically indispensable to navigators. As a compliment to King Charles, Gioja adopted the fleur-de-lys as the ornamental sign that should mark the north point in his improved compass, and the custom has continued.



WHY A COAT HAS BACK BUTTONS

A man's frock or morning coat always has two buttons at the back just where the tail of the coat begins. These are simply for ornament now, and serve no useful purpose, but they are a survival from the time when back buttons were necessary. The frocks of coats were at one time worn very long, and in order that the wearer might not be hampered in his movements when walking quickly, buttons were put on the back of the coat, and buttonholes in the corners of the skirts, so that the skirts might be buttoned up.

THE NEXT BOOK OF WONDER IS ON PAGE 5685.

CONTINUED FROM PAGE 5320.

THE KING'S GUEST

ONCE upon a time there was a rich man who was very cruel to the poor people living on his estates. They were very poor people indeed, and the rich man, who owned all the land and employed all the people, paid them very low wages, and oppressed them in every way. There came a famine in the land, and the poor people went to the rich man's castle and begged for bread, but the rich man refused them even a crust.

The king of the country heard all this, and he sent for the rich man to come and dine with him. You may imagine how proud the rich man was when the king's invitation came. He got out his best horses and his best carriage, and dressed up his servants in wonderful garments, and drove to the king's palace.

The king led him into the dining-room, where the table was laid for two. It was laden with lovely flowers and fruits, and foods of every kind, and there were the king's servants to wait upon each of them.

They brought the soup to the king, and he drank it, and when he had nearly finished it they brought the rich man some soup. But just as he was about to taste it the king finished his soup, and the waiters took the plates away, so that the rich man had not even a spoonful. Then they brought the king another dish, which he enjoyed, and just as he was finishing it they brought the rich man's dish. But almost before he could touch his knife and fork, the king had finished, and both plates were taken away.

And so they brought the king dish after dish, and the king, as he enjoyed them, said continually to his guest how good these things were and how much he hoped the rich man was enjoying them. Yet every time the rich man tried to taste his food, a waiter came and took his plate away. And so at last the dinner came to an end, and the rich man had not had a single bite of food. Not even a crust of bread could he get, for the waiters forgot to bring him any; and when you are dining with a king you must not ask for anything. And, of course, the rich man was very hungry, for he had been so busy getting ready for this dinner with the king, that he had had nothing to eat all day, and the dinner had lasted a long time.

When the meal ended, the king led the rich man out of the dining-room into the hall, and bade him good-night, and set him out on the long, long road to his castle. Not a word did he say about the strange dinner at which his guest had eaten nothing, but the rich man went home almost famished with hunger, and he never forgot the lesson the king had silently taught him. He was very good to the poor after that, and became their true friend.

THE WONDER BOOK

The forest was very wonderful. The child who roamed through it felt the wonder of it seize him with a strange mystery and power.

Every day he wandered down its shady paths, and into its secret places.

The splashing of sunlight upon green leaves, the sound of falling rain, the soughing of boughs in the wind, filled him with an exquisite joy that was at the same time a sorrow.

And ever as he grew to know the forest, he felt that over its solitudes there brooded an invisible presence.

He seemed to see the print of its feet in the grass, to hear its voice in the wind, and once he felt its trailing garments brush past him, and a soft breath fan his cheeks.

It became the desire of his heart to find the secret of the forest. At last he found it.

One day he followed a tiny brook farther and farther from its source, deeper and deeper into the forest, until he came to a place shut in by the trees where the brook formed a still pool.

An old, old woman sat by the pool. Then, as he looked at her, he saw her dip her feet into the pool, and moment by moment she became a new creature.

She held out her arms to the winds, and they gave her their strength and freedom; she called to the trees, and they gave her a supple grace and form; she caught the sunbeams, and imprisoned them in her hair; and the depths and stillness and flashing lights of the pool passed into her eyes.

Other children would have fled in terror, but to this child fear was unknown, and he went forward until he came face to face with the woman who now stood in glorious beauty as wonderful and changeful as the moon.

They gazed deep into each other's eyes; then the woman bent forward and touched his brow.

"You are one of those who are not afraid," she said.

Then she led him into the very heart of the forest. Here the thick trees and undergrowth could not push themselves; they ceased at the margin of a circle of green grass as soft and fine as a fairy carpet. Overhead, the sky shone into the circle like a great blue eye gazing down upon it, making it glow and gleam.

In the centre there stood an altar fashioned of different woods from the forest, and upon the altar lay a great book. The woman led the child up to the book, and he looked into its pages.

Oh, the marvel of it! He seemed to be looking into a picture of the forest, and yet it was not a picture, for the trees bent and swayed, the brook rippled, and the grass waved. He saw the hidden haunts of the squirrel and the mole, and of all the shy wood things. He saw deeper still; he saw the struggle of the seed with the earth, and how the grass and flowers and trees grew into being.

Then into the moving picture shone the faces of beautiful maidens; they passed between the trees, the sunlight gleaming on their hair; knights in armour rode down the paths; black-cowled monks paced slowly along, followed by leaping jesters in their coloured coats and jingling bells. Faster and faster they crowded into the picture, until the boy's dazzled sight could bear no more.

Every day from henceforth the boy went to the pool in the forest, and every day the woman met him and led him to the book, and turned over its pages for him.

Sometimes the pictures were, like the first ones he had seen, of this same forest, peopled with lovely ladies and courteous knights. Sometimes he saw the fairies at work and play.

Then the pages would open, and show the streets of a great city; the boy would look upon the crowds, the merchants, the wealthy citizens, the beggars, the richly-dressed women.

Again he would look into the book and see wonderful palaces and temples and cities of long ago; he saw the courts of great kings and queens long dead.

His heart became bound up in the book, and he thought of little else.

He was so dreamy and idle, and spent so much time wandering in the forest, that everyone thought him a most stupid boy. But when the boy grew older and had to leave his home and the beautiful forest, he wrote down all that he had seen in the Wonder Book. And all the world loves to read about the things he saw, and some day you will read them, too. For the wonderful forest was the Forest of Arden, and the boy's name was William Shakespeare.

THE BOY SHAKESPEARE IN THE FOREST OF ARDEN

As a boy, Shakespeare loved to roam through the forest and to feel its mystery and power. Every day he wandered down its shady paths and into its most secret places until he grew to know it, and felt that over its solitudes there brooded an invisible presence. He longed to discover the secret of the mystery and power of the forest.

PROVERB STORIES

Every nation has its proverbs—short, pithy sayings in which are contained much wisdom. The stories on this page illustrate some of these proverbs.

THE FARMER AND HIS SACKS

Repay Kindness with Kindness

A FARMER was taking his grist to the mill in sacks thrown across the back of his horse. On the way, the horse stumbled, and one of the sacks fell to the ground. It was too heavy for him to lift, and he was at a loss to know what to do. As he stood wondering, he saw a horseman coming towards him.

When, however, the rider came nearer, the farmer saw that he was none other than the nobleman who lived in the great house at the top of the hill. It was impossible to think of asking help from one of his rank.

The nobleman, however, was something more than a man with a title—he was a gentleman, and he dismounted.

"I see you have had something of a mishap, friend," he said. "It is fortunate I came along just now, for help is not always handy on these roads."

So saying, he took one end of the sack, the farmer took the other, and the load was once more placed on the horse's back.

"My lord," said the farmer, lifting his cap, "how can I thank you?"

"Easily enough, my good fellow," said the nobleman. "Whenever you see anyone in a difficulty, help him all you can, and that will be thanking me."

THE BAG OF PEAS

There's no Luck in Laziness

"DO you believe in luck?" said a king to one of his officers.

"Yes," answered the officer, "I do."

"Ah!" laughed the king. "I am afraid you could not prove to me that there is any such thing in the world."

"That may be, your Majesty," answered the officer; "but if it please you, we might try to find out. I have thought even now of a plan."

He whispered in the king's ear, and his Majesty replied:

"Very good, very good indeed; let us try it without loss of time."

So that night the officer hung a bag from the ceiling of one of the rooms in the palace. What it contained none but the king and the officer knew. Then two men were put into the room. When the door was shut, one of the men who believed in luck laid himself in a corner and prepared for sleep; the other looked about him, and at once saw the bag hanging from the ceiling.

He reached up and put in his hand, and found some peas. "One might have a worse supper," he thought, as he took out a handful and ate them.

Presently he came on some diamonds, but, in the dark, he thought they were mere stones, and of no value. So he threw them towards his companion, saying:

"You may take the stones for your idleness."

In the morning the king and his officer came to the room, and told each man he might keep what he had found. The one man got the peas which he had eaten; the other got the diamonds.

"Now, your Majesty," said the officer, "what do you say?"

"Truly," answered the king, "you seem to have the best of the argument. There may be such a thing as luck; but it is as rare as peas mixed with diamonds, and so let none hope to live by luck."

THE TWO KINGS

The Second Word Makes the Quarrel

THERE was once a king who sent a message to the king of a neighbouring country, saying:

"Send me a blue pig with a black tail, or else——"

To this the other king replied:

"I have not got one; and if I had——"

When the first king got this answer he flew into a great rage, and declared war against the other. For many weary months fighting went on, but at last the two kings arranged a meeting.

"What did you mean," said the first, "by saying 'Send me a blue pig with a black tail, or else——'?"

"Why," he answered, "I meant a blue pig with a black tail, or else some other colour. And now let me ask you what you meant by your message, 'I have not got one, and if I had——'?"

"My meaning was simple enough; for, of course, if I had had such a pig I should have sent it."

"Dear me, how foolish we have been! Let us make peace and be friends."

So peace was made, and the story was written in the annals of both countries to serve as a warning to those that should come after to be slow to take offence.

THE HUNDRED THOUSAND MONKEYS

This is a story that begins on the banks of the River Ganges, in India.

There are villages on the banks of the Ganges, and in one of them a little boy called Singh lived in a hut with his father and mother. It was his business to make curry for his father and mother while they were busy out of doors.

But one day Singh found it hot and also dull in the hut where he was busy with the curry. The sun was hotter still outside, but when he went to the door and looked out, Singh saw cool shadows under the tree, cooler than the dark of the hut, because of the breeze that was lifting the big leaves and letting them flap softly back again. So Singh went and lay in the shadow of the tree.

Presently his father and mother came back hungry for their curry, and when they found that Singh had forgotten all about it, they beat him till he was very sore, and then made curry for themselves.

Singh ran away into the forest.

There were parrots in the forest, green and red and yellow, and they shrieked loudly as they flew from the palm to the banyan tree, and from the acacia to the feathery bamboo. There were snakes, spotted and shiny ones, brown and yellow ones, and black ones, and pale bright green ones, and they hissed and slid away into the long grass. There were bigger things, too.

Singh heard the bamboos crack and the branches break, and saw the long grass wave where the big beasts were stepping. He also heard them roar. He thought they would probably eat him, but he did not mind, because his body was sore. And then a monkey dropped to the ground in front of him. The monkey had been hanging by one hand from the bough of a tree watching Singh for some time.

"AAH!" SAID A HUNDRED THOUSAND SERIOUS-FACED APES, THEIR EYES FIXED ON HIS FACE

This picture is from the painting by J. C. Dollman, A.R.W.S., by permission of Sir Alfred Hickman, Bart.

"What is the matter with you?" asked the monkey.

"I have been beaten," said Singh.

"No, no, that is not what is the matter with you," said the monkey.

"What is it, then?" said Singh.

"Why, yes. Your beating is over, and your skin is already not so sore as it was. The matter with you is that you want to tell a hundred thousand people about it, and there's no one to listen to you."

"Yes," sobbed Singh, "that is quite true. They are eating curry in the village, and if I try to tell them about it they will only beat me again, and make me more sore."

"Come with me," said the monkey, "and you shall tell a hundred thousand people, and they shall weep for your sore body, and you will feel better."

He caught Singh with his skinny hand, and ran through the undergrowth of the forest. Singh ran with him for a long time. He was too busy dodging branches, and jumping over fallen logs or puddles of mud, to notice how they went; so that he was not very surprised when the trees came to an end, and the forest opened into a white old city lying in marble ruins. There were fallen temples and wonderful broken pavements. And everything shone dead white in the hot, glaring Indian sunshine.

There were no people in the city, but as for monkeys—there seemed to be more than Singh believed there were in all the forests of the world.

"Tell these people," said the monkey who had brought him. And when the other monkeys crowded up, this monkey looked laughingly at Singh, and went away, and sat alone on the marble steps of what had long ago been a temple.

"I have been beaten and my back is sore," began Singh.

"Aah!" said a hundred thousand serious-faced apes, their eyes fixed steadily on his face.

"Because I lay in the sun and neglected the curry while they were working."

"Aah!" said the hundred thousand apes, all looking very much interested.

"My name is Singh, and I am very miserable."

"Aah!" said the apes.

"The people of the village have cast me out with a sore skin and no curry."

"Aah!" said the apes.

"A sore skin and no curry," said Singh again, for he could not think of anything else to say.

"Aah!" said the apes, as if these were only the beginnings of his troubles.

Singh could not think of anything else, and he was very unhappy, because he wanted to complain.

"Aah!" said the apes.

"A sore skin," said Singh miserably.

"Aah!" said the apes impatiently. He heard some of them say, "Is that all?"

"No curry," he said once more; and then getting up quickly, he looked for the monkey who had brought him, and saw him sitting on the temple steps.

"Please take me back," he said. "I am not miserable enough for these people."

And the monkey said, "I thought so," and laughed, and took him back. But he was not beaten again. His mother was glad to see him, and gave him hot curry and put him to bed.

Now, that is the best of all ways to be comforted. If ever you feel miserable, go and tell it to a hundred thousand serious-faced monkeys, and you will find that you are not miserable enough.

THE KAFFIR AND THE LION

An old Kaffir was trudging back to his master's farm in Northern Rhodesia when he heard a sound in the bush that made his blood run cold. A white stranger would not have known what the slight but continual crackling in the brushwood meant, but the native knew, and trembled.

A lion was following him, and watching him as a cat watches a mouse. But, not being emboldened by hunger, it was waiting till nightfall to make its spring. Unhappily, it was already growing dusk, and the farm was still far off, and the old man had no other weapon than the stick that he was tottering along with.

How could he escape? The Kaffir glanced anxiously around. There was no bush high and strong enough to protect him from the lion. But as he went along the old negro worked out a plan, a simple but very daring plan, which probably no white man would ever have thought of.

On coming to a low hill that sloped gently up on one side, and then ended in a sudden precipice, the native slowly walked up it, and sat on the edge of the rock. Half turning his head, he saw the lion watching him.

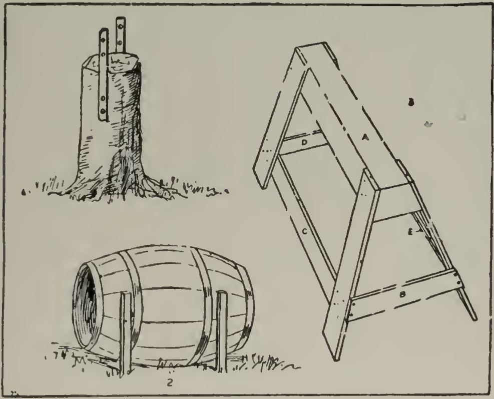
As soon as it grew dark, the old man climbed down to a footing underneath the precipice, and, putting his hat and coat on his stick, he lifted it above the rock. In the meantime the lion had been creeping up. When within striking distance, he made a sudden leap at the hat and coat and stick, and over the precipice he went, and landed on the plain with a broken neck. The next morning the wise old Kaffir had the pleasure of skinning his dreaded enemy.

THE NEXT STORIES ARE ON PAGE 5689.

CONTINUED FROM PAGE 5532.

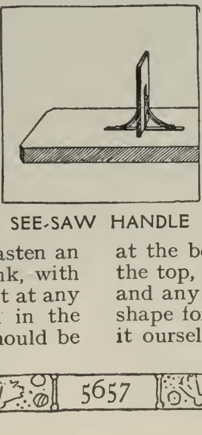
HOW TO MAKE A SEE-SAW

A SEE-SAW is one of the simplest things to make, and a great deal of amusement can be obtained from it in the garden, not only by boys and girls, but by the grown-ups too. All we really need is a good stout plank of wood that will bear the weight of two people—one at each end—without bending, and some sort of a support upon which the plank may be placed, and which will act as a fulcrum, or pivot. For a see-saw is the simplest kind of lever, and, as we know, a lever has three parts. In the picture at the top of this page the trestle is the fulcrum, the lady is the weight, and the little girl is the power that has raised the lady. In a moment the lady will go down, when she will become the power, and the little girl will go up and be the weight.



DIFFERENT KINDS OF SUPPORTS

The plank, of course, we cannot make, but must obtain it from some builder or woodyard. It should be of sound wood, about 1½ inches thick, 12 inches wide, and 10 or 12 feet long. It may be painted, or not, as we like, but it certainly must be planed very smooth. If we want to have a handle at each end for holding when we are sitting upon the plank and it is going up and down, we can easily make one. We simply fasten an upright batten of wood to the plank, with an iron angle, such as may be bought at any hardware store, in the way shown in the bottom picture on this page. It should be put in the middle of the plank's width, and should be about 18 or 20 inches from the end. Now we come to the fulcrum, or support, and here we may select almost anything that is most handy. If there is a wide and sound stump of a tree that has been chopped down, standing about 2½ feet high, in some suitable position, it will serve our purpose admirably. To prevent the plank slipping off as it is worked backward and forward, we can smooth the sides of the stump and screw an iron angle at each side, as shown in picture 1. If no such stump is standing, but the trunk of a felled tree is lying on the ground, this, of course, does equally well; or even better, for the roundness of the trunk enables the see-saw to work better. A barrel placed on the ground and secured with stakes, as shown in picture 2, makes a very good fulcrum. A mound of earth also will provide all that is necessary for our purpose. If none of these supports are available, we may make a trestle like that being used for the see-saw in the picture at the top of this page. It can be made as shown in picture 3. We need a stout beam (A), 2 or 2½ feet long, 4 inches deep, and 4 inches wide at the bottom. It should slant off toward the top, along its whole length, to 3 inches, and any carpenter will make the beam this shape for us if we have not the tools to do it ourselves. When we obtain some wood



SEE-SAW HANDLE

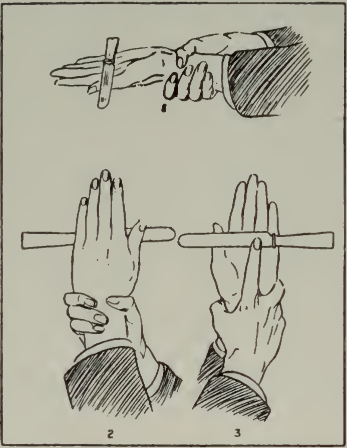
suitable for the legs and supports, about 3 inches wide and 1¼ or 1½ inches thick. We saw off four legs, say, 2¼ or 2½ feet high, and screw these on to the beam, using five screws, as shown by the dots in picture 3. We should use long screws that will firmly grip the two pieces of wood; but they should not be very thick, or they may split the wood.

Then we saw off four pieces of wood, B, C, D, and E, and screw them to the legs for supports, as shown in the picture. All we now need to do is to place the trestle on the ground, drive in a little stake on each side to steady it—as shown in the picture at the top of the previous page—place the plank upon the trestle, and then see-saw as much and as often as we like. If two children are using the see-saw, the plank should be placed upon the support with half the plank on each side; but if a grown-up person is to be at one end, and a boy or girl at the other, then there should be a greater length of plank on the side upon which the child sits.

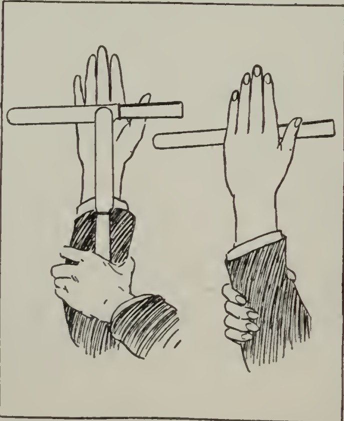
If the grown-up person at one end weighs 9 stone and is 3 feet from the middle of the swing, then the boy, if he weighs 3 stone, to balance the grown-up person, must be 9 feet from the middle. If we know the weight of the two persons, we can always tell exactly at what distance from the middle they will balance each other, as the power at work depends on weight and on distance. Once get our see-saw and we can have great fun.

THE MYSTERY OF THE SUSPENDED KNIFE

An amusing and simple trick that will greatly surprise all those who see it performed, unless they know the secret of how it is done, is that of the mysterious knife. We take an ordinary dinner-knife, and place it on the palm of the hand, as shown in picture 1. Then, talking a great deal about animal magnetism and the wonders of attraction, and explaining that it is necessary to keep a firm grip on our wrist in order to concentrate the magnetism, we cleverly turn over the hand with the knife, and, holding it up, show the knife apparently suspended without being held, as in picture 2. If the trick is carefully performed, the spectators will be greatly mystified. The explanation is given in picture 3. In turning over the hand with the knife, we quickly stretch out the forefinger of the right hand, and hold the knife up with this, while the thumb and other three fingers continue to grip the left wrist. If we continue to talk, to divert the attention of the spectators, and do not hold up the knife too long at one time, it is quite unlikely that anyone will notice that only three fingers of the right hand are visible. If, however, they do suspect that we are supporting the knife, then we can offer to do the trick again, removing the right hand away from the wrist and placing it so that the fingers of that hand could not possibly touch the knife. What the audience then see is shown in picture 4. This trick looks even more mysterious than the other, and if it is cleverly and carefully performed, there seems to be no explanation of how the knife is suspended upon the palm of the left hand, for the audience can see no apparent means of support. It is, however, done quite simply, and the method of supporting the knife is shown in picture 5. The thumb of the right hand holds the second knife close against the left wrist and palm, and this keeps the first knife in position. Of course, it is more difficult to perform this trick than the first one, as there is more chance of the spectators discovering the trick, owing to the difficulty in concealing the second knife. With a little practice, however, it may be done quite easily. We should, of course, have one or two knives on the table before us, and should pretend to take some trouble in selecting a good one. "This one," we can say, "is not magnetic enough." Then we take up another and try it, and so on. This deceives the audience and distracts their attention, and enables us to pick up the second knife to support the other. We shall naturally see to it that only blunt knives are used, and should there be any difficulty in obtaining suitable knives, we may use any other flat, long, and narrow objects that are not too heavy. Ordinary twelve-inch boxwood rules are very good objects with which to perform the trick, and if these are not available, ordinary flat sticks of wood are almost equally good. It is always wise to practise such a trick a good deal when we are by ourselves before trying to astonish our friends, as so much depends upon quickness and neatness in our movements, otherwise the method of supporting the knife will be noticed. Although, as already stated, we should not hold the knife up too long at one time, or our friends may discover the secret of the trick, yet we can show them the wonderful performance again and again, taking the greatest care always to keep the second knife that supports the other well out of sight of the people who are watching.



HOW THE KNIFE IS SUSPENDED



ANOTHER METHOD OF SUPPORT

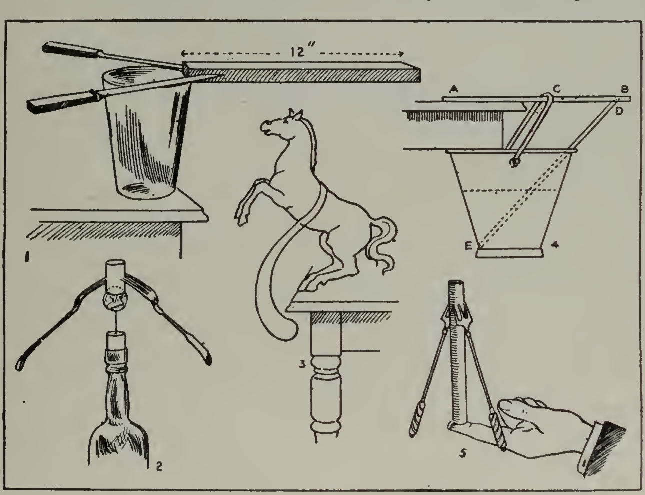
SOME CLEVER BALANCING FEATS

There are a number of balancing feats which cause great astonishment to many who see them, and which seem very difficult indeed to perform and yet are really simple. To those, however, who know a little science, and understand the meaning of the phrase, *centre of gravity*, they do not seem at all wonderful, for the true explanation is perfectly clear.

Picture 1 shows a balancing feat that may seem difficult, but is so easy that any boy or girl can do it. We take a piece of wood about ten or twelve inches long, and into it, near one end, we stick the blades of two knives, as shown. With a little adjustment, according to the size and weight of the knives and the length of the wood, we can balance the tip of the wood on the thin edge of a wine-glass or tumbler.

A somewhat similar experiment is that shown in picture 5, where a stick is balanced with perfect ease upon the finger. Some little distance from the top we insert two knives or two forks, and by means of these the stick is made to balance perfectly.

Rather more difficult is the experiment which we see in picture 2. In this we are able to spin a quarter upon its edge on the point of a needle. First of all we take a bottle, such as a vinegar bottle, with a cork in it, and into this cork we push a needle, head downward, so that the point is sticking up. Now we take another cork, and in the end make a slit, into which we fix a quarter. Then into the sides of the cork we stick two ordinary table-forks, at an angle. We are now ready to try the experiment. We put the edge of the quarter upon the point of the needle, as shown in the picture, and if the forks have been properly arranged in the cork the quarter will balance easily. The coin, with the cork and forks, can then be spun round and round on the point.



EXPERIMENTS THAT SHOW THE WONDERS OF BALANCE

Perhaps we may like to make a balancing toy which we can keep to show to our friends. Picture 3 shows such a toy. On stout cardboard we draw a prancing horse, with its head and legs very much forward. Across the back, and flowing out under the body in the direction of the tail, is a sash or rug, and at the end of this we fix a flat weight of some kind and cover it with paper. When we stand the horse upon its hind legs upon the edge of a table, as seen in the picture, it stands upright and firm.

Another interesting balancing feat, that appears very wonderful, can be performed with a pail of water, as shown in picture 4. Upon a table, a stick, A B, is laid, and a pail is hung upon this in the manner indicated. The handle, C, is at an angle to the pail, and the edge of the table should reach out just beyond the middle of the pail. To keep the pail in position a stick, D E, is placed in the pail, one end, E, being against the angle where the bottom of the pail joins its side. The stick must also touch the top edge of the pail, and its other end touches the stick A B at D, where a notch is cut to prevent it slipping. The pail is now perfectly balanced, and water may be poured into it until it is full.

The explanation of all these balancing feats lies in the secret of the centre of gravity. The centre of gravity of a body is the point at which the whole weight of the body may be said to be collected, and if a body be supported at its centre of gravity it will keep perfectly balanced.

In the first experiment, for instance, the wood and two knives are, to all intents and purposes, one body, and the weight of the knives being greater for their length than that of the wood, the centre of gravity of the whole is not midway between the end of the knives and the extreme end of the stick, but much nearer the knives. Hence the wood will balance perfectly, as shown. The experiment shown in picture 5 explains why it is very much easier for a man to carry two parcels weighing, say, fourteen pounds each, one in each hand, than it is for him to carry one parcel of twenty-eight pounds in one hand. The two parcels of fourteen pounds, one on each side, balance one another, and the man is able to walk upright, which is the easiest position for walking. But when he carries the twenty-eight pounds in one hand all the weight is on that side, and it is necessary for the man to bend his body the other way, so that the centre of gravity of himself and the heavy parcel combined may be in a right position to keep him from falling.

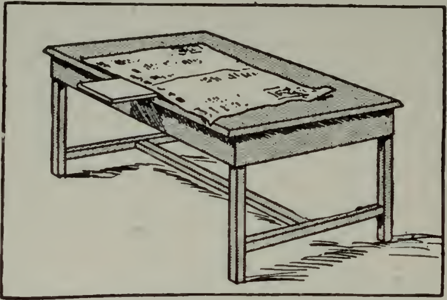
A boy was once carrying a heavy parcel in his right hand, when the string broke and the parcel fell to the ground. At once the boy toppled over to the left. He had been leaning to the left owing to the weight on his right, but directly the parcel fell, the centre of gravity, which had been correct when there was a heavy weight on one side, was in the wrong position, and the boy, being top-heavy, fell over. We can see how this happened if we remove one of the forks in the experiment shown in picture 5, when the stick will at once fall over on the other side.

HOW TO FEEL THE PRESSURE OF THE AIR

THERE is a very simple scientific experiment by which the pressure of the atmosphere may be felt, and which will, at the same time, cause a great deal of surprise and wonder to those who perform or see the experiment for the first time.

We take a board measuring about two feet in length by four or five inches in width, and, say, a quarter of an inch in thickness. This we place upon a table, with about six inches projecting beyond the table, and cover it with an opened newspaper, as shown in the picture on this page, taking care to smooth the paper down all over so that it may lie as flat as possible on the table.

Now, clenching the hand, we bring it down with a sharp, hard blow upon the projecting wood. One who has never tried the experiment before naturally expects that the board will be knocked down off the table. But no matter how hard we may strike, the board will not go down.



THE BOARD THAT WILL NOT MOVE

The projecting end may be broken off, but the board itself cannot be moved. And yet, if we *press* slowly and gently upon the end with only one finger, the board can easily be pushed to the floor.

The explanation of the apparent mystery is to be found in the scientific fact of the pressure of the atmosphere. The air presses upon everything on the surface of the earth with a force equal to fifteen pounds on every square inch. But this pressure is unnoticed by us in ordinary circumstances, because it works equally in all directions.

When, however, the pressure of the air is removed from one side of a body, it is felt with great force on the other side. It is this removal of the air-pressure from one side that happens when we strike the projecting board.

The blow is given sharply, and the air has no time to rush in between the table and the newspaper. The result is that the pressure of fifteen pounds to the square inch is exerted in a downward direction only, upon the surface of the paper, and when we strike the end of the board this pressure is felt just as though the other end of the board were held down by heavy weights. It must, of course, be understood that the blow is to be short and sharp, the fist being removed from the board instantly. If the blow is a prolonged one, and the hand rests upon the board for more than a moment, it will go down, because then we are doing practically the same thing as when we deliberately press upon the board. The air has no time to rush in under the board, and the pressure of the atmosphere then being the same both below and above the board, there is nothing to counteract our blow as is the case when we strike sharply and quickly, and the air-pressure is exerted on the top of the board only.

CARDS THAT TELL ANY NUMBER THOUGHT OF

IF we take six visiting cards, or any other suitable pieces of card, and copy on to them the six sets of figures that are printed below—putting one set on each card—we shall be able, with the six cards that we have made, to tell any number that a friend may have thought of.

We ask the friend to think of a number, and then we show our six cards, desiring that he will point out on which of these cards the number thought of appears. In a moment we tell him the number, much to his astonishment.

The explanation is very simple. We merely add up the figures that appear on the top right-hand corners of the cards upon which his number appears, and the total that results is the number thought of. Thus, suppose that our friend thought of 47. It is on the first, second, third, fourth, and sixth cards. The figures in the top right-hand corners of these are 1, 4, 8 2, and 32, which, added together, make 47—the number thought of. We can guess people's ages in this way, and can get a great deal of fun and amusement from so simple a set of figure cards.

Some people know of figure cards by which a number can be guessed but these are usually arranged so that the top *left*-hand figures have to be added to give the solution, whereas here the *right*-hand numbers must be added. If any of our friends have seen figure-guessing cards before, they will at once say that they can do the thought-reading as skilfully as ourselves. We let them try, and by adding up the *left*-hand figures they find that they are hopelessly wrong every time.

3	5	7	9	11	1
13	15	17	19	21	23
25	27	29	31	33	35
37	39	41	43	45	47
49	51	53	55	57	59

5	6	7	13	12	4
14	15	20	21	22	23
28	29	30	31	36	37
38	39	44	45	46	47
52	53	54	55	60	13

9	10	11	12	13	8
14	15	24	25	26	27
28	29	30	31	40	41
42	43	44	45	46	47
56	57	58	59	60	13

3	6	7	10	11	2
14	15	18	19	22	23
26	27	30	31	34	35
38	39	42	43	46	47
50	51	54	55	58	59

17	18	19	20	21	16
22	23	24	25	26	27
28	59	30	31	48	49
50	51	52	53	54	55
56	57	58	59	60	31

33	34	35	36	37	32
38	39	40	41	42	43
44	45	46	47	48	49
50	51	52	53	54	55
56	57	58	59	60	46

VERSES MADE WITH FIGURES AND LETTERS

Writers of verses have shown a great deal of ingenuity in using for their rhymes words that can be expressed by figures or by single letters, which, when pronounced, give the sound, either exactly or almost exactly, of the words represented. A great deal of amusement may be obtained on a wet evening, when we have to remain indoors, by gathering a party round the table with pencils and paper, and seeing who can in a given time, make up the best rhymes in this way. The examples given here will show how the letters and figures are worked into the lines. The first little poem is a very good specimen of the use of single letters as a substitute for actual words.

The Chinaman praiseth his T's,
The mandarin praiseth his Q;
The gardener praiseth his turnips and P's,
But I praise U.

The mariner loveth the C's,
The bagatelle-player his Q;
The husbandman loveth his cattle and B's,
But I love U

The foolish have need of the Y's,
The actor needeth his Q;
The pilot hath need of two excellent I's,
But I need U.

The hunter seeketh the J's,
The shepherd seeketh his U;
The college boys seek their final B.A.
But I C Q.

Here is an example of verses in which double letters are used all through for the rhyming words. This is more difficult to arrange. The double Y, of course, stands for "Wise," and so on.

There is a farmer who is Y Y
Enough to take his E E,
And study Nature with his I I,
And think of what he C C.

He hears the chatter of the J J,
As they each other T T,
And sees that when a tree D K K
It makes a home for B B.

A yoke of oxen he will U U,
With many whoas and G G,
And their mistakes he will X Q Q
When ploughing for his P P.

He little buys, but much he sells,
And therefore little O O;
And when he hoes his soil by spells,
He also soils his hose.

This little poem has all the figures from one to ten, with the single exception of the figure 5, worked into it in a very clever way.

Astronomy is 1-derful,
And interesting, 2
The ear 3 volves around the sun
Which makes a year 4 you.

The moon is dead and calm,
By law of phy-6 great;
It 7 where the stars alive
Do nightly scintil-8.

If watchful Providence be-9
With good in-10-tions fraught,
Did not keep up its grand design,
We soon should come to 0.

Astronomy is 1-derful,
But it's 2 mighty 4
1 man 2 grasp, and that is why
I'd better say no more.

Of course, in the third line of the second verse the "h" is omitted by writing "It 7" for "It's heaven."

Here is one of the nonsense rhymes called Limericks in which figures are very cleverly worked in to represent syllables.

There was an archbishop named T8,
Who dined with a friend at 8.8;
But, sad to relate,
I'm unable to state
What T8's t8-à-t8 8 at 8.8.

Another limerick in which the figure 8 is introduced in a very similar way is this.

They dined all alone at 8.8,
On oysters they dined and 8 8;
And he asked his dear K8
To tell him his f8
When they 8 t8-à-t8 at 8.8.

Here is another verse in which letters are used to take the place of a word.

A budding author, something new
Submitting, signed himself X Q;
The editor the paper read,
And begged he might be X Q Z.

Another little verse was headed "U C I D K," and, after puzzling over this title for some time, the editor to whom it had been sent read the verse, which was as follows:

Surely, good sir, you follow me?
It is as plain as A B C;
Repeat it in a treble clef,
For I am rather D E F.

The title was, of course, "You see I decay."

Perhaps one of the best poems in which letters are used for words is the following, which is entitled "A Maid of R K D."

A dainty maid of R K D
Is F E in her bower;
Smart as U C A honey-B;
And sweet as N E flower.

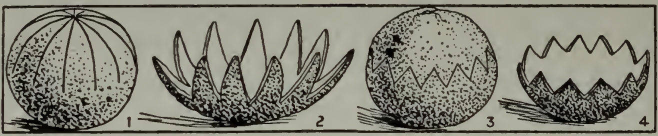
Does she S A herself 2 please,
X Q Q the little miss,
She sings an L E G 2 T T,
Or blows an M T kiss.

"B mine," I say, "U bonny J,
B4 U R mine L (my knell);
When U R gay, my hopes D K,
In T-sing U X L."

Without ado she takes the Q,
Her I I B9 and B D;
"O, sir, I do not N V U,
I C U R so need E."

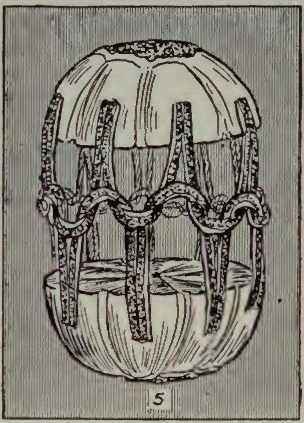
"O F E, U I C R true,
Y need I C Q less?
I'll never D V 8 from U,
But end my cares with 'S' (caress)."

CURIOUS WAYS OF PEELING AN ORANGE

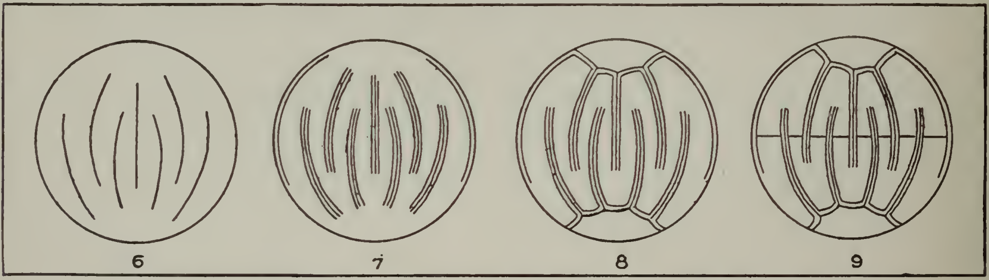


1, 2, the orange cut to make a water-lily ; 3, 4, to make a rose-bowl

There are various ways of peeling an orange which give very artistic effects, and which can be done quite easily with a little practice. Perhaps the simplest of such methods of cutting the peel of an orange is that shown in picture 1. With a sharp knife we cut a number of slits from the top to about two-thirds the distance down the orange, and then gently and carefully pull away the peel all round from the white of the orange. We take the orange itself away, and open out the gores, or cuts, as shown in picture 2, and we have a water-lily. If a night-light be put in the middle and be lighted, the effect is very pretty. A more elaborate way of cutting the peel of an orange gives the beautiful result shown in picture 5. First of all, we cut lines all round the orange as in picture 6; then on each side of these cuts, and about three-sixteenths of an inch away, we must cut other lines parallel to those already made, so that we now have the orange with a series of triple cuts as shown in picture 7. These cuts must now be joined up at the top and bottom of the orange in the manner shown in picture 8, and then across the middle, or equator, of the orange we cut the peel between the lines as is shown in picture 9.



5. An artistically peeled orange



The different stages of cutting the peel of an orange to produce the artistic effect shown in picture 5

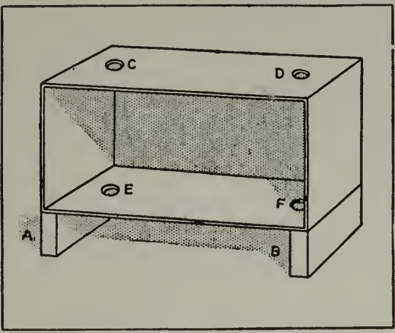
All is now ready, and with a small, blunt penknife we gently raise the peel everywhere from the body of the orange, taking care not to break any of the ribbons. Great patience is necessary, but at last we get the figure shown in picture 5; and if we are careful we can remove the orange from inside, piece by piece, or, if we do not wish to do this, we can let it remain and wither with the peel. Another artistic method of peeling an orange is to cut it as shown in picture 3, and then to pull back the peel carefully and release the orange so that we get two cups of the form which we see in picture 4. In cutting and peeling oranges in these fancy ways, one or two points must be remembered and carefully observed. First of all, in choosing our orange we should select a large one, not over-ripe and not under-ripe. It should have a smooth skin, not too thick, and without blemishes. Then for the cutting we must have a really sharp knife with a fine point, and in cutting we must not cut too deeply. The cuts should be clean, so that there are no jagged edges to the ribbons, and great care should be exercised so that we may not cut across places or lines that should not be cut. If we cut wrongly in making the design of picture 5, the whole scheme of cutting will be spoilt, and the peel will not fall into the proper loopings as they are shown in the picture. But with a little care and patience any clever boy or girl can become quite expert in fancy orange peeling, and will soon be able to invent new and artistic designs.

A FILTER THAT A BOY CAN MAKE

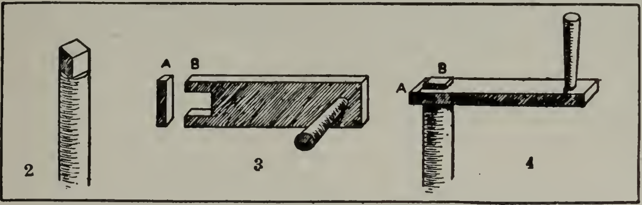
It is always well to filter our drinking-water, especially if we live in the country, and there is a very simple form of filter that any boy or girl can make with little trouble. We take an ordinary garden flower-pot eight or nine inches in diameter at the top, and after thoroughly washing it we stop the hole with a piece of sponge, which must not fit too tightly. Then we put in a layer of charcoal, about two inches deep, and above this a layer of clean sand, with a layer of clean, coarse gravel three inches thick on top. The filter is now quite ready for use. We fix it up over a vessel of some kind, and let the water which we want filtered run through the various layers in the flower-pot. Of course, from time to time the filter wants cleaning out thoroughly, but this is done quite easily, and we shall find that, simple as is this little apparatus, we have a thoroughly effective and serviceable filter.

HOW TO MAKE A MOVING PANORAMA SHOW

A MOVING panorama show with a constant appearance of fresh pictures and fresh scenes is always an attractive toy, and with patience and care may be made by any industrious boy. First of all we need the body of the show, and for this an old cigar-box will do very well—the kind of box that holds 100 cigars. Let the open end—that is, the original top of the box—be the front of our show. On the bottom, as shown at A and B in picture 1, we nail or screw two pieces of wood to serve as feet. Now, in the top of the box at the places C, D, and in the bottom at the corresponding points E and F, we make two neat round holes. They should be in the middle of the width of the box, and about 1¼ inches from each end. Next we must prepare the rollers for the panorama. These are to fit into the holes on each side of our show, and they must be two round pieces of wood, rather thicker than a blacklead pencil. They should be long enough to project half an inch above the holes C and D, and half an inch below E and F. At the top of each of these rollers we cut a square end, as shown in picture 2; then we make a handle, as in picture 3, to fit on to this square end. The little piece of wood A is to fit on to the end B when the handle is fixed on the square end of the rollers, as may been seen in picture 4.

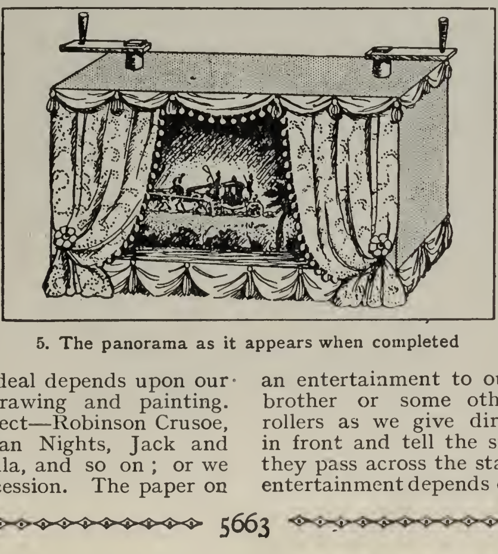


1. The framework of the stage



2. Squared end of roller; 3. Crown piece; 4. Handle finished for use

We now prepare the front of our stage by draping it in some way with curtains, and here there is plenty of scope for artistic taste. The width of panorama showing at one time should be about four inches in the middle of the show, so that we drape the sides accordingly, taking care that the rollers on which the panorama works, are quite hidden from the front. The drapery of the show may be in actual silk or velvet, or it may be painted on cardboard, according to our opportunities, skill, and taste.



5. The panorama as it appears when completed

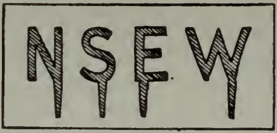
The next thing is to prepare the panorama, and here again a great deal depends upon our ability and skill in drawing and painting. We may select any subject—Robinson Crusoe, scenes from the Arabian Nights, Jack and the Bean Stalk, Cinderella, and so on; or we may like to draw a procession. The paper on which the panorama is drawn should be in one long piece, not too stiff, to roll easily round the rollers, and not so soft that it will tear easily. It should be about four inches wide, but if it is difficult to get that width we may have it narrower, provided we bind something round the rollers above and below where the paper winds on, in order that the panorama may wind evenly round the middle of the rollers. In using a narrow paper we must, of course, adapt our stage scenery and drapery to hide the top and bottom of the roll of paper as it moves across the show. We have said that a very great deal depends upon the skill of the artist in preparing his panorama. But even those who cannot draw at all may make an interesting panorama by cutting out from illustrated papers the figures of men and animals and so on, and pasting these carefully on the roll of paper as required. Of course, they must be cut from pictures printed on fairly thin paper, or the roll will get too clumsy to wind easily. It will take some time, too, to make a panorama in this way, as we cannot at once get exactly the figures we require to make up our scenes. Of course, we can make up a story if we like; and then there is plenty of scope for cleverness in fitting together the figures and objects we are able to cut from pictures in the illustrated papers.

When the roll is quite prepared, we put our rollers through the holes at the top of the show and into the holes at the bottom. Then we fasten one end to one roller with glue, taking care that the pictures are on the side seen through the opening of the show. When the glue is quite dry, we turn the handle and roll the paper round the roller, until there is just sufficient left unrolled to glue the other end to the other roller. When this is dry, the panorama is quite complete and ready to show.

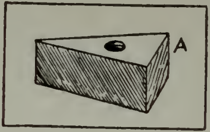
We can then give an entertainment to our friends, getting our brother or some other friend to turn the rollers as we give directions, while we stand in front and tell the story of the pictures as they pass across the stage. The interest of the entertainment depends on how the story is told.

AN EASILY MADE WEATHER-VANE

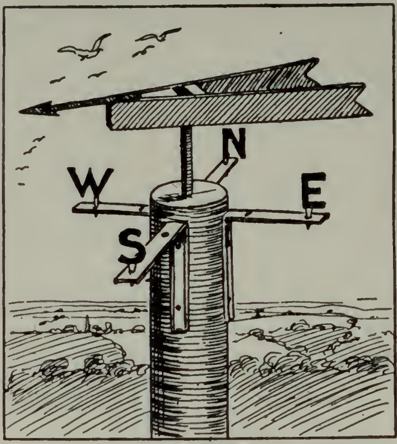
Every clever boy can erect a weather-vane in his garden with very little trouble and at scarcely any expense. We obtain a fairly stout pole or post, straight, but whether square or round in shape does not matter at all. We then screw on to the post, at right angles to each other near the top, four iron right angles such as can be bought at any hardware store for a few cents. These are to indicate the four points of the compass. With a fretsaw we cut out four wooden letters, N., S., E., and W., with an arm underneath each as shown in picture 1. This arm is, in each case, to insert into the screw-hole that is always found in the iron angles that we buy at the hardware store. We must therefore have the arm wide enough to fit tightly into the hole of the iron angle. It can be kept perfectly firm in the hole by inserting a piece of wood on each side of it in the hole. Now we must make a hole in the top of the post, and firmly insert an iron rod about a quarter of an inch in diameter. This rod should be roughly pointed at both ends, and could be obtained from a blacksmith. The pole is now ready, and should be erected in the garden at a spot that is open to the winds from all directions. A sheltered spot is quite useless for a weather-vane. In erecting the post we should dig a hole about 3 feet deep, insert the post, and then fill in the earth, pressing it down tightly. On the ground immediately round the post, we should stamp in some gravel, as this will help to tighten the hold of the earth on the post. If we want additional security in fixing up our post, we can, of course, get some cement from a builder and mix this with water, placing the wet cement in the hole all round the post. When it dries, the cement will hold the post very firmly. Now we make the weather-vane itself. We take a wedge-shaped piece of wood as shown in picture 2, and bore a hole right through it of a diameter large enough for it to turn quite easily and smoothly on the iron rod at the top of the post. Then we nail across this hole at the top of the wedge a piece of sheet-iron, so that, when the wedge is slipped on the iron rod at the top of the post, the rod will not go right through. On each side of the wedge we screw a piece of quarter-inch board, 4 inches wide by 20 inches long, as in picture 4, and where they meet at the point A join them nicely; and bevel to a sharp angle. A metal or wooden arrow may be cut or sawn out and screwed on to the vane to act as the pointer B. We lift the vane on to the rod at the top of the post, fitting the rod into the hole in the wedge, and our weather-vane is quite complete and ready for use. Of course, in erecting the post in the garden we must see to it that the N., S., E., and W. point actually to these different points of the compass. A small pocket-compass, costing a nickel, may be used to guide us in doing this quite correctly.



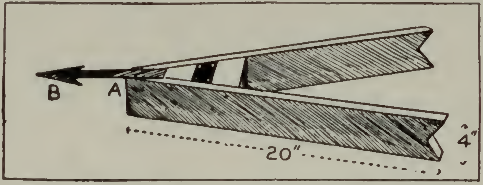
1. THE LETTERS



2. THE WEDGE



3. THE WEATHER-VANE IN POSITION

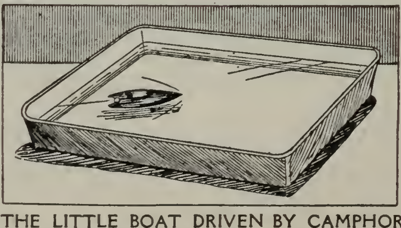


4. THE WEATHER-VANE READY FOR THE POST

A LITTLE BOAT THAT MOVES IN THE WATER

It is easy to make a simple little boat that will move along in the water without mechanical appliances of any kind. We cut out of a thin piece of tinfoil a shape something like a boat, about two inches in length, with a triangular nick at the end. The tinfoil must, of course, be very thin. Then we place this gently on the surface of the water so that it will float.

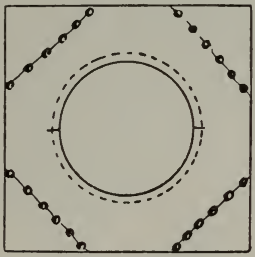
Now let us take a piece of camphor, such as can be bought at any chemist's shop for a penny, and from this cut off with a penknife a little piece about the size of a small pea. We place this upon the end of the tinfoil boat at the angle of the nick, so that while resting on the boat it also just touches the water. In a moment or two the boat will begin to move, and will continue to do so as long as the camphor touches the water. By cutting the tinfoil a little curved or like a horseshoe in shape we shall have a boat that will travel round and round in a circular dish or basin. A skilful boy will be able, with a small piece of very thin wire and a fragment of tissue-paper, to erect a mast in the boat, with a flag at the top of the mast.



THE LITTLE BOAT DRIVEN BY CAMPHOR

A PRETTY NEEDLEWORK BAG

A pretty little bag to hold fancywork can be made in a very short time by any girl who understands something of plain needlework. The larger we want the bag, the more silk is required, of course; everything depends upon the size of the work it has to hold. But if we remember that, whatever the width, the length must be just double, we shall find we shall not go far wrong. Now, having found an oblong piece of material, twice as long as it is broad, we fold it in half, and with a pair of compasses, or a saucer, draw a round on one half, and cut it out, as shown in picture 1. Then we turn the folded material on the wrong side, and sew the sides together. We turn it to the right side again, and the bag will now be a flat piece of double material. Now our stuff is getting to look more like a bag, although it is not nearly finished. The next thing to do is to turn our attention to the round hole, which is still raw-edged. As we cannot turn in a hem here, a false piece must be put on; so we cut a little strip of the same material, large enough to go round the hole, but making it a little too big, to allow for the turn where it is joined. We sew this round the hole, putting the two right sides of the material together. When this is done, and the ends are joined together to make it neat, we turn the false piece over and hem it down on the other side. All the plain sewing part of the bag is now finished, but the part that really ' makes " the bag is yet to come.



1. THE OPENING

Across each corner we draw a line, being careful to draw all four alike, and work French knots along each line, sewing right through the two pieces of stuff. To make French knots, we twist the silk—for we must not use cotton—round the needle several times, and put the needle in where we wish it to go, pulling the silk through until the silk on the right side of the bag sets in a little lump. If this is our first attempt, we may find that we pull the silk right through, but if we pull slowly a little practice will soon put us right. When we have worked all the lines with French knots, as shown in picture 1, we must run a cord through the little false hem. We cut two little slits on opposite sides of the round hole, and work them in buttonhole-stitch—with silk, not cotton—then we run the cord or ribbon through, and the bag is finished. Little silk tassels sewn to each corner make a pretty finish.

2. THE BAG COMPLETE

If the bag is made of thick cream silk, with the French knots, buttonhole-stitch, and cord or ribbon of primrose, the effect is charming.

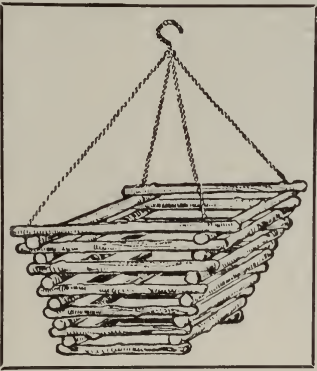
A FERN BASKET FOR A NICKEL

For an expenditure of five cents, and with very little trouble, any intelligent boy can make a pretty fern basket. Let us go out into the woods and collect some oak branches about three-quarters of an inch thick, and varying in length from six inches to twelve inches. We shall require between thirty and forty pieces altogether for our purpose.

When we take these home, we must score down the bark from end to end of the sticks, and then, having put them in a pail, we pour boiling water on them. The effect of the scalding will be to strip off the bark, leaving us nothing but the bare sticks, which are just what we want for our purpose.

Besides the sticks which we have collected, all the material we require is a little copper or brass wire, which we can purchase for five cents. Copper or brass wire is better than iron wire, because iron wire would rust through and waste away. It will be seen that the basket tapers from about twelve inches square at the top to about six inches square at the bottom. Of course, we need not keep to these sizes; we can make the basket four inches at the bottom and eight inches at the top, or any other size that we find convenient.

We may colour the sticks by putting them into water in which we have put a small amount of permanganate of potash or of logwood. The former will dye the sticks brown, and the latter will dye them an artistic purple. We require to make holes at the ends of our oak sticks. In doing so we must be careful not to split the wood. To make the holes, which must be slanting, we should use a gimlet, but if we cannot make the holes without splitting the sticks, we can use a red-hot wire for the purpose, heating it again whenever it gets cool. The latter process is slow and tedious, and we should not adopt it unless we are compelled to do so. Then we thread the wires through the holes, as seen in the picture. The wires are twisted together at the top ends, from which our fern basket hangs. We may, if we like, varnish the basket after we have made it. Across the bottom we should put one or two cross sticks, so as to do away with the wide opening. Then we line the bottom and all four sides with green moss, which we can procure for ourselves in the woods. Having done so, we put a layer of stones and gravel in the bottom and fill up the basket with good earth, in which we place the fern. When we wish to water the fern, we ought not to pour water on top of the basket. We should take it down and dip the entire basket in water, letting it remain for half an hour. Rain or pond water is best, but tap water will do if we cannot easily get either of these.

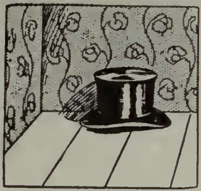


THE BASKET READY FOR USE

HINTS AND TRICKS FOR ODD MOMENTS

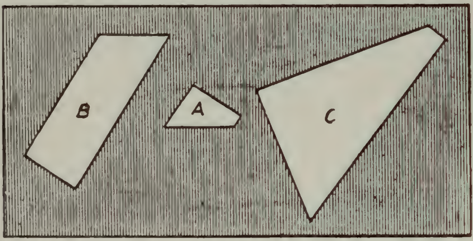
HOW HIGH IS THE HAT?

Our eyes play us many tricks, and they often deceive us as to the size or height of anything. The apparent height of a hat, for instance, may be very much greater, or it may be less, than it really is. There is an interesting experiment by which we may prove this to ourselves. We should place some mark on a wall to show how high up we think the top of a tall silk hat will come when the hat is stood on the floor against the wall. It seems a very simple and easy thing to give a fairly accurate estimate, but we shall probably be hopelessly out. Let us mark the estimated height first, and then see how accurate we are, by placing the hat against the wall, as shown in the picture. It will spoil the amusement and stop the surprise if we say here whether the estimate is likely to be greater or less than the real height.



TO FORM A SQUARE

Cut out ten pieces of card—two of the size and shape of A, four of B, and four of C—and then arrange them in such a way that they will form a perfect square. When they are jumbled up it seems impossible that they could be made into a square, and when we try to put them together it seems equally impossible; but with perseverance we shall probably be successful. If we are not, and the task is beyond us, we can turn to the solution which is given in the next Little Book of Entertainment.

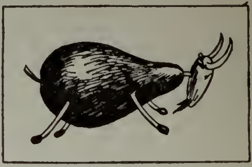


A WHIRLPOOL IN A TUMBLER

If we fill a tumbler with water and throw upon the surface some thin shavings of camphor, these will instantly begin to move about and give the appearance of a miniature whirlpool, the movement continuing for some time. But if we now dip into the water anything that is greasy—as, for instance, the end of a pencil that has been rubbed with oil—the particles of camphor will dart to the sides of the glass, and the motions will cease immediately.

A GOAT MADE FROM A PEAR

Here is a picture of a goat made up from a pear with the aid of four matches, an almond, and some raisin-stalks. We stick the matches into the pear as shown, then we get a well-shaped almond from its shell to form the head, and into this we stick curved raisin-stalks for horns, two or three stalks for a beard, two short pieces of stalk for ears, and the whole is fixed to the end of the pear by means of a stalk or piece of match, thus forming the neck of the goat. A hole is cut on each side of the almond for the eyes. With a little ingenuity and practice we can make other animals from the different kinds of fruit.



CURIOUS WAY OF MEASURING A TREE

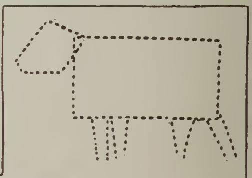
Some of the natives of South America have a curious way of measuring the height of a tree or tower. They turn their backs to the tree, and walk away from it until they come to a spot where, keeping their backs to the tree, they can, by stooping down and looking between their legs, see the top of the tree. Then they make a mark on the ground, and the distance from this mark to the base of the tree is, roughly, the height of the tree. Any boy can thus tell within an inch or two the height of a tree or building.

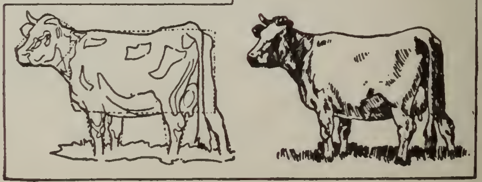
WRITING WITH INK ON WOOD

If we have ever tried to write with pen and ink upon ordinary wood, we know how difficult it is. Directly we have written the words the ink begins to run, and if our pen has been well filled the words become, in a few moments, a mere blur, no matter how well they may have been written. To avoid this running of the ink, there is a very simple precaution which we can take, and that is to rub the wood with powdered resin, when we shall be able to write upon it with ink quite easily and well.

A SIMPLE WAY TO DRAW A COW

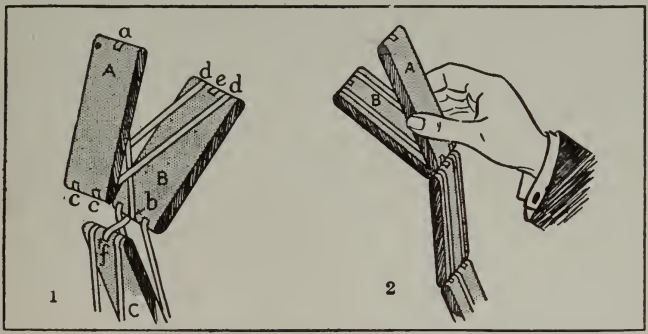
Here is a simple way of drawing a cow. We begin by making a rough pencil outline of the shape of the cow, as in the first picture, getting the proportions correct. Then we begin to fill in the details of the animal, as in the second picture, and it will be found that the rough outline first drawn is a great help in making our sketch. When we have the cow pencilled in completely, we ink over the lines that are to remain, then rub out the pencil-marks, including the original framework, and if we have done our work well we have a drawing something like the third picture here.





THE MYSTERIOUS JACOB'S LADDER

A very old puzzle, which is easily made, is that known as the Jacob's ladder. It consists of an ingenious arrangement of little pieces of wood and tape, so fastened together that by holding the top piece of wood and alternately inverting it and bringing it back to its original position, another of the pieces of wood is apparently constantly falling from the top to the bottom of the ladder. To make one of these clever little toys, we first of all get some suitable wood from which to cut the pieces we need, and for this purpose nothing better could be obtained than an ordinary cigar-box. We decide how many steps our Jacob's ladder shall have, and although it may consist of any number, great or small, an average number is ten. A greater number becomes rather unmanageable.



THE METHOD OF FIXING THE TAPES & HOW TO WORK THE LADDER

The pieces of wood must all be of exactly the same size—say, $3\frac{1}{2}$ inches by 2 inches; and when they are cut out with a fretsaw they should be nicely smoothed, and the top and bottom angles rounded slightly by rubbing with sandpaper.

Ordinary white or pink or black tape about $\frac{3}{8}$ or $\frac{1}{2}$ an inch wide is used for joining the pieces of wood, and the method of fitting them to the wood is shown in picture 1. Each piece of wood has three tapes, and all the tapes should be of the same length—about 5 inches—so that the ends can just pass round with enough length to glue down on the wood as seen in the picture. There is a centre tape and side tapes for each piece of wood, and the arrangement is the same in each case, however many steps the Jacob's ladder may have. The centre tape *a* on the board A is fastened on the far side of the board B at *b*. The side tapes *c c* on A are fastened on the other side of B at *d d*, while the middle tape *e* on the board B passes on to the board C, and is fastened at *f*, and so on throughout the entire length of the ladder. When all the tapes have been glued, we hold the top little board A as in picture 2, and B seems to fall to the bottom; then we invert A, and again the board next to it seems to fall to the bottom. A is returned to its original position, and the board drops again, and so on without end. The whole thing is a clever optical illusion. This toy is said to have been invented in Japan many hundreds, if not thousands, of years ago, and hundreds of thousands of Jacob's ladders are sent from Japan every year for sale in the cities and towns of Europe and America.

THE DANCING DWARF ILLUSION

An excellent illusion that will give a great deal of amusement at an evening party is that of the dancing dwarf. Very little is needed in the way of apparatus, but two performers are required to carry out the deception, and if a third person can be enlisted to assist in the arrangements, all the better.

The best place to perform the trick is in the opening between two rooms that are separated by folding doors. Curtains usually hang here, and they are needed for the performance. The doors are thrown back and a table is placed just in front of the curtains. This table must have drapery hanging to the floor, like a dressing-table. Another curtain is hung between the audience and this table to hide the table until the performers are ready.

Now to prepare the dwarf. The taller of the two performers disguises his face with a wig, false whiskers, and burnt cork; and he pulls over his hands and arms a pair of stockings, of some bright colour if possible, and puts his hands into a pair of shoes, ornamented with buckles or large bows. The shorter of the two performers now stands behind the other, and thrusts his arms forward under his companion's armpits; and a tunic, that must be specially made for the purpose, is placed in position, being fastened round the neck of the tall performer, while the arms of his short companion are passed through the sleeves of the tunic. The shoe-clad hands of the tall partner are placed upon the table and represent the feet of the dwarf. Their owner bends forward, and the curtains are securely fastened above his head and are pulled close to the tunic at his sides, so that nothing will be seen by the audience but the disguised head, the stockinged arms and hands, which appear to be legs, and the arms and hands of the second partner, which really seem to belong to the owner of the head and legs. The whole presents the appearance of a dwarf with a very large and grotesque head.

All is now ready, and the third partner goes in front, and, addressing the audience, says he is going to introduce to them Prince Ponatowski, the wonderful Polish dwarf, or he uses some similar name. He then removes the front curtain, and there is the dwarf, who, if the preliminaries have been arranged with care, presents a wonderfully realistic appearance.

The showman must, of course, talk to the audience about the wonders of the dwarf, during which time the dwarf looks about, blinks his eyes, moves his hands, and shifts his legs from one position to another. With a little practice it is possible for the dwarf to play a whistle, but this needs care, as the whistle has to be held in the hands of the short performer, who is behind the curtain and cannot see, while it is placed to the mouth of the taller performer. It is, of course, important that the one who does the head and legs part shall not use his hands *as* hands, or the illusion will be spoilt.

AMUSEMENT WITH STOPS AND COMMAS

The little commas and full-stops, and other similar signs that we see scattered about this page, and the pages of all the books that we read, do not seem very important. Yet, without these, it would very often be quite impossible for us to know what a writer meant.

Some sentences and paragraphs, indeed, can be made to have two exactly opposite meanings, according to how the stops are put in, and a good deal of amusement can be got if a few friends sit round a table, each having before him a paper and pencil, and try to punctuate correctly some of these rather difficult sentences. The sentences and verses given on this page may be used for this purpose.

SENTENCES THAT NEED STOPS

Here is a very startling statement :

King Charles the First walked and talked half an hour after his head was cut off.

We might doubt the accuracy of this, but when we know that there should be a semicolon after *talked*, and a comma following the word *after*, then the meaning is quite plain :

King Charles the First walked and talked ; half an hour after, his head was cut off.

Many of us know the little rhyme :

Every lady in this land
Has twenty nails upon each hand
Five and twenty on hands and feet
All this is true without deceit.

We wonder how it can be true, till it is properly punctuated in this way :

Every lady in this land
Has twenty nails ; upon each hand
Five, and twenty on hands and feet.
All this is true without deceit.

Here is a sentence that makes perfect sense when the stops are put in, but it looks now very much like a mere jumble of words :

That that that is is that that is not is not that that that is not is not that that is is not that so.

It should be punctuated in this way, and the words in italics should be emphasised :

That *that* that is, is *that* that is not, is not ; that *that* that is not, is not *that* that is, is. Is not that so ?

When a gentleman made the remark to his friend, " Time flies you cannot they pass too quickly " he was not talking about the passing of time, but about the timing of flies. A semicolon after *cannot* makes the sentence clear.

THE INSPECTOR AND THE MAYOR

A Prussian school-inspector called one day upon the burgomaster, or mayor, of a small town, and asked him to come on a tour of inspection of the schools in the district. The burgomaster was not anxious to go, and the inspector heard him mutter to himself : " What is this donkey here for again ? " At the first school, the inspector said he would like to examine the children in punctuation. " Oh, bother that ! " said the burgomaster, anxious to get on to the next school. " What do commas and such trifles matter ? " But the inspector insisted, and, writing a sentence on the board, he asked a boy to read it, which the lad did as follows : " The burgomaster says the inspector is a donkey." Then, putting commas after the words *burgomaster* and *inspector*, he asked another boy to read the sentence, thus : " The burgomaster, says the inspector, is a donkey."

In this rhyme, to make sense, a semicolon should be placed after the first noun in every line except the last of each verse ;

I saw a peacock with a fiery tail
I saw a blazing comet pouring down hail
I saw a cloud all wrapt with ivy round
I saw a lofty oak creeping on the ground
I saw a beetle swallowing up a whale
I saw a foaming sea brimful of ale
I saw a pewter cup sixteen feet deep
I saw a well full of men's tears that weep
I saw wet eyes in flames of living fire
I saw a house as high as the moon and higher
I saw the glorious sun at deep midnight
I saw the man who saw this wondrous sight.

I saw a pack of cards gnawing a bone
I saw a dog seated on Britain's throne
I saw King Edward shut up in a box
I saw an orange driving a fat ox
I saw a butcher not a fortnight old
I saw a greatcoat all of solid gold
I saw two buttons telling of their dreams
I saw my friends who wished I'd quit these themes.

Some years ago a London news agency received a cablegram from its correspondent in Australia which read as follows :

" Influenza extensively prevalent Wales Victoria numerous deaths Bishop Adelaide found dead sea-serpent sixty feet Coffin Bay."

This was published in the newspapers as three separate items of news to the effect that influenza was very prevalent in New South Wales and Victoria ; that the Bishop of Adelaide had been found dead ; and that a great sea-serpent, sixty feet in length, had been seen in Coffin Bay.

As a matter of fact, the bishop was not dead, and it was he who was supposed to have found the remains of a dead sea-serpent lying on the beach at Coffin Bay sixty feet long.

STOPS THAT COST MONEY

Some years ago, the blunder of an American clerk, in putting a comma in the place of a hyphen, cost the United States nearly $2,500,000. A duty was to be put on certain goods going into the country, and among those to be allowed in free, were " all foreign fruit-plants," meaning young fruit-trees for planting. In copying this part of the Bill for Congress, the clerk made it read : " all foreign fruit, plants," and so on. The result was that for a year, until Congress could set the mistake right, all kinds of fruit were allowed into the United States free of duty.

A wealthy Frenchman died, and by his will left a large sum of money to his two nephews. Each expected to receive *two* hundred thousand francs, but the executors said they were entitled to only *one* hundred thousand. The nephews pointed to a sentence in the will which read like this : " A chacun deux cent mille francs," meaning, " To each two hundred thousand francs " ; but the executors pointed to a small apostrophe between the *d* and the *eux* of deux, thus making the sentence read : " A chacun d'eux cent mille francs," which means, " To each of them a hundred thousand francs." The executors, however, had to pay the nephews two hundred thousand francs each, the law court having decided that the mark was a tiny smudge, and not an apostrophe.

CONTINUED ON PAGE 5893

THE MAGNIFICENT PANORAMA OF THE ALPS AS SEEN FROM MURREN

AMONG THE SNOW-CAPPED ALPS

A FAMILY TOUR IN SWITZERLAND

CONTINUED FROM PAGE 5565.

Our first united Swiss holiday was long under discussion. For months, maps and guide-books have been pored over with a view to making schemes of tours, and the chief topic of thought and conversation have been the heaviness and fit of our boots, the lightness of our waterproofs and luggage, the suitability of various sorts of hats to stand rain and wind, as well as shade the eyes from too much sun. Other preparations have been extra vigour in our regular Swedish exercises and deep breathings, a handful of salt in our baths, and steady walking on every possible opportunity, especially up hills. At last we are off, all very fit and everything complete.

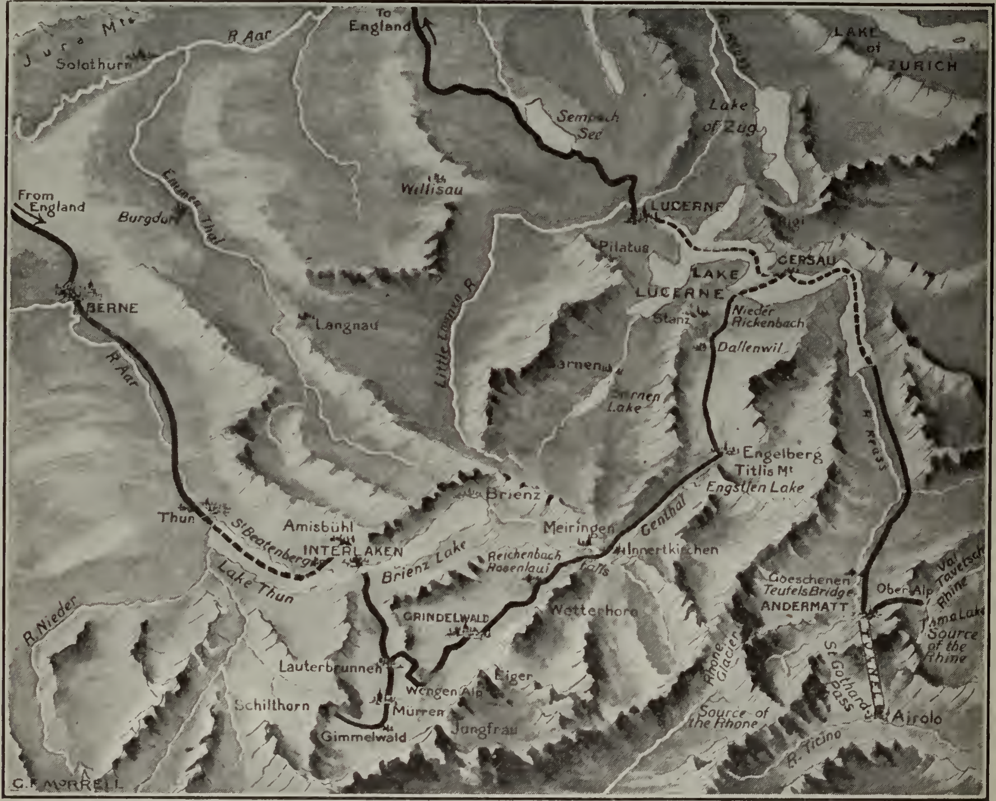
We are a merry party at breakfast next morning at Berne, in spite of a Channel crossing and a long night journey across the plains of France. Our spirits began to revive when the wide, sad plains—so inexpressibly lovely in the misty grey dawn—gave way to the uplifting hills of the Jura country ushering us into Switzerland. As we watch the hastening rivers and the fleeting woods and valleys—foretastes of delights to come—we feel that the real starting-point of our long-talked-of, long-prepared-for tour is at hand.

After-breakfast we find a shop where we can buy iron-pointed walking-sticks and the brown waterproof knapsacks with pockets, that fit so comfortably to the shoulders with straps. This done, we long more than ever to be off, but Berne holds us. How interesting are the shop arcades, the beautiful fountains, the famous bears in their pit, eating oranges so neatly, bathing in their pond with absurd antics! Such high bridges as those over the swiftly flowing Aar, ever so far below, we have never seen.

The sun is shining, and we have no eyes for anything but the views from the bridges, from the grand terrace on which the cathedral stands boldly out over a hundred feet above the river, from the Schänzli, a hill close by, where we have our first out-of-door meal.

But the view! It is our first sight of the distant glittering white mountains, which seem to us, as we gaze, a sort of link between earth and heaven, rising from the lower hills, such as those we already know, to mingle with the clouds of the sky above. A mighty company of giants they look, these chief peaks of the Bernese Oberland, or Highland, and as we sit on, making out the Jungfrau and her neighbours, and other groups, unable to tear ourselves away, a beautiful rosy flush spreads over their unearthly whiteness; it is the sun's good-night kiss. And then we begin to feel tired, and gladly take the tram home to supper and to our delightfully comfortable Swiss beds.

Eager as we are to be off in the morning, we feel that we must wait a few hours to go to the Natural History Museum to see the relief map of the Bernese Oberland and compare it with our flat ones, tracing on it the valleys and passes we have planned to see, meaning to go on foot as much as possible. We take, too, a hurried glance at the beautiful crystals from St. Gothard, and at the animals of Switzerland, past and present. And then we rush for the train to Thun, knapsacks on backs, packed with necessaries for the night, having sent on in advance all the luggage we cannot carry. All the time in the train the wonderful mountains come closer and closer, and when we take the steamer on Lake Thun new beauties are unveiled at every turn as we seem to pass almost under their shadow.



THIS PICTURE MAP SHOWS THE ROUTE OF THE HOLIDAY IN SWITZERLAND

Too soon comes the little pier at which we are to land, and from which a mountain railway takes us up a very steep mile. Every moment the view becomes grander and grander. Somehow, we think of Jack climbing the beanstalk and the wonderful country he found at the top as we step out of the station and start walking along the road cut out of the Beatenberg Slopes.

There are woods rising on the left, woods and fields sinking downwards to the lake on the right. The long village of St. Beatenberg straggles along this road for two or three miles, with large hotels, and little shops full of carved bears and other Swiss articles. On and on we go, past the last big hotel, and then up a bit more hill, till we are nearly a thousand feet higher than the village, and have arrived at Amisbühl.

All our lives we can never forget our week at Amisbühl. From the deep verandah, where we can have all our meals if we like, we look right across Interlaken—the town "between the lakes" of Thun and Brienz—to the glorious mountains that have seemed to call us on all the way from Berne. We can study them from our grand point of view at every hour of the day, in all sorts of weather, and find them always changing in colour and beauty.

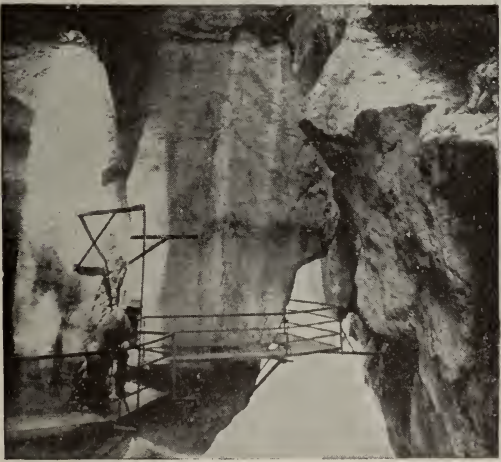
THE GLORY OF THE ALPINE HEIGHTS

GRINDELWALD VALLEY AND THE WETTERHORN

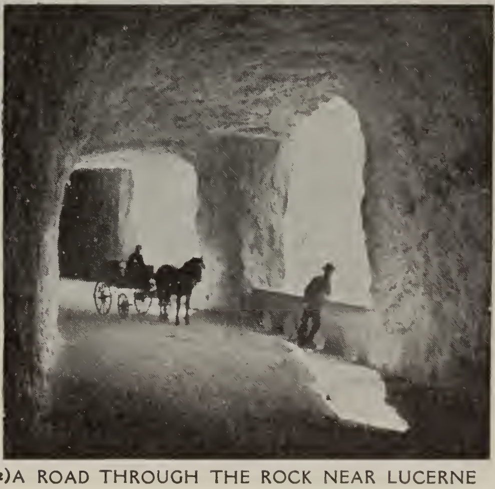
(2) GOATS ON THE ALPINE SUMMITS

(1) CLIMBING A DIFFICULT PEAK

(2) CROSSING A DEEP CREVASSE



(1) A CRAGGY ROAD OVER THE RIVER AAR



(2) A ROAD THROUGH THE ROCK NEAR LUCERNE

These pictures give some idea of the grandeur and variety of the scenery in the Alps. The glory of the snowy peaks, the indescribable beauty of the fertile valleys as seen from the lofty heights, the paths and roads over and under and through the solid rocks, are sights never to be forgotten by the traveller who has ever seen them.

The photographs on these pages are copyrighted by Underwood & Underwood, N. Y. (1), and the H. C. White Co. (2).

With the telescope we can see climbers like black specks, and many details of the rocks, snow, and ice that make up a snow landscape. The grandeur of it all in a thorough good storm of thunder and lightning makes us breathless. Never have we heard such thunder as this, echoing as it is tossed back from mountain to mountain; never has lightning revealed to us such desolation for such brilliant moments. And sometimes, when the mists cover the lake and the town far below, and the valley beyond, we wonder if they can really be there, for we can see nothing below the grey sea of mist.

THE ANCIENT CITY OF THUN
Copyright by Underwood & Underwood, N.Y.

Then, while we are still bewildered, the scene suddenly changes. All below lies in golden sunshine and bright colour, and the mists have rolled up and entirely hidden the many mountain-tops.

We get into the habit of waking early to watch from our windows the glories of the sunrise. Each day of our stay we take beautiful walks up the hills, and soon succeed in getting up the slippery grass slopes, for we have nails in our boots, to see over the ridge to the next valley beyond. Charming white goats come and play with us, and share the salt we have to eat with our hard-boiled eggs; and we get milk in the chalets of the high pastures on which the beautiful brown cows wander, the loud bells fastened round their necks jangling in every variety of notes. And all too soon the day comes for us to shoulder our knapsacks, having posted our portmanteaus on to Mürren, and find our way past the haymakers—they always seem to be making hay in Switzerland—and the barns, and the chalets, down and down through the woods for three thousand feet to the lake, and the town between the lakes.

ON THE LAKE OF LUCERNE
Copyright by H. C. White Co.

Some of us would fain linger in the town, for the shops are most tempting; but we push on by train up the valley we have looked at so often from Amisbühl, to Lauterbrunnen, mounting all the time, and enjoying the hurrying, foaming river which runs down beside the line, and the changing views of the snow giants, who now seem close upon us. We might take the cable railway up to Mürren, but we decide to do the climb, which we thoroughly enjoy, for there are little leaping rivers to cross, besides all the delights of shady, mossy paths, and wild strawberries. When we emerge, somewhat tired and heated, on the plateau on which Mürren stands, we feel overwhelmed by the nearness and immensity of the mountains, divided from us by a narrow, deep valley. What a glow there is that evening upon them, everyone rushing out from dinner to enjoy the sight for the few minutes that it lasts! And from our window we see the goats come down the lane from the mountains to sleep in the village; we hear their bells in the morning when they start, soon after the glorious sunrise. We spend some days at Mürren, two as wet as wet can be, no view, no fires, no little girls and their mothers at every corner making lace for tourists to buy; but we read up our route, write our letters, and on fine days enjoy our walks all the more for a rest. Such walks! Each day we think we have found a more beautiful one than the last. But the unforgettable one is to the Schilthorn, our first big climb. We go on, up and up, till we come to a dreary valley, all rocks and snow, which we are delighted to cross, even if we do sink in over our boots, when the sun is on it; and then imagine coming upon a field one blaze of blue, dark blue gentian, pale blue forget-me-nots, and below it a blue, blue lake, and above, over all, the bluest of skies. We have a fine scramble back, tobogganning part of the way, and much enjoy crossing a wide and dashing river on stepping-stones.

1 SWISS PEASANTS AT BREAKFAST

Then comes another glorious walk. Leaving Mürren early in the morning, packs on back, luggage posted to Nieder Rickenbach, we take the road for four or five days. We quickly find our way past Gimmelwald, down and down to the head of the Lauterbrunnen valley, and all day long we realise to the full the meaning of its name—nothing but water. Torrents rush down the steep sides in great leaps, or fall sheer over hundreds of feet; rainbows glitter on the thin veil of mist made by smaller falls, and the path through the woods is ever twisting and turning as if to disclose new beauties at different points.

2 THE UPPER GLACIER AT GRINDELWALD

Presently we find ourselves at the foot of a high cliff, and, lo! there is one of the hotels at Mürren perched on the very top of the height; on the other hand are the steep slopes leading to the Jungfrau mass. Climbing a little way up this slope, we come to the Tummelbach Falls, where the water rushes magnificently through rocky chasms in the heart of the mountain. We stand peeping into these chasms, sheltered from the spray by umbrellas provided by little boys on the spot, and then see the mass of water shoot out in one wild bolt into mid-air, to fall in a rushing stream below. And then, as we pursue our way down the valley, we fall in with a delightful Swiss schoolmaster, who tells us of the school he taught in in New York, and of the interest of Zurich, where he lives, till we wish our tour could take that in too. We are astonished at his powers of walking, and have at last regretfully to say good-bye, and see him swing on towards Interlaken, while we must stop at Lauterbrunnen, at the point in the valley where we started our climb up to Mürren. A bigger climb is now in store for us, up the Wengern Alp and up to the top of the pass of the Little Scheidegg, but we decide to do it by the railway, which winds upwards through meadows and pine-woods, over bridges, and through tunnels. The views become grander and wider as we go up and up, over the Lauterbrunnen valley by which we have come, and to Mürren and the mountains behind. And then we feel quite bewildered by the overwhelming nearness of the glaciers, and the immense and dazzling snow mountains, now only two or three miles away. We have begun to be familiar with the forms of many others beside the Jungfrau, the Monk, the Eiger, the Silverhorn. We spend the rest of the day exploring the various points of view, and parts of the daring railway which aims at reaching the top of the Jungfrau by a series of tunnels and lifts. We feel deep interest in the climbers, with ice-axes and hammers, who can strive to win the top—we would give something to be able to join them or even to look down on the summits from an airship. We feel so unwilling to leave this wonderful ridge, whence our onward route can be seen through Grindelwald

Copyright by Underwood & Underwood, N. Y. 1

Copyright by H. C. White Co. 2

to the Great Schiedegg beyond, that we stay another day and night on the top, climbing the Lauberhorn, and spending hours drinking in the wild beauty of the entire chain of this Bernese Oberland, which we first saw so distant and ghostlike from Berne.

We feel as if we had descended to another world next day when passing through noisy Grindelwald, with its crowds of tourists and vehicles, shops and hotels, so we push on towards the beautiful three -peaked Wetterhorn, and spend the night in an hotel an hour or so beyond Grindelwald, near the Upper Grindelwald glacier. We visit the Ice Grotto cut out in the thickness of the ice, and find great interest in the blueness of the cracks, and the débris brought down by the ice river and dropped where it thaws, and we cannot resist a trip in the wonderful train by which we mount high in air, as in a lift, and look far over the sea of ice, with its frozen waves and the smiling valley, which forms such a contrast with its beautiful pastures, shut in by bare peaks and dazzling snow. And then, after vainly trying to make friends with a splendid St. Bernard mother and her puppies, we set our face for the pass of the Great Scheidegg, up and up—enjoying the bluebells and the heather, and the little leaping rills, and the colours of the rocks and the sky—and thankful indeed are we for coffee at the inn on the top of the pass, whence we get a farewell view of the giants who have made our lives seem fuller and wider, and the world a nobler home than we have ever realised before.

It is easy enough descending by the lovely path overshadowed by the Wetterhorn and his companions. Now and then we hear the thunder of a falling avalanche and see the light snowflakes dispersing like a white cascade. It is in the early spring that the very destructive falls happen, burying chalets, and, indeed, whole villages.

THE VILLAGE OF GRINDELWALD
Copyright by Underwood & Underwood, N. Y.

We get beds at a saw-mill when night overtakes us, and next morning find it difficult to leave the fascination of watching the running water turning the wheels and working the busily cutting saws; but Rosenlaui with its wonderful gorge calls us, the splendid Reichenbach Falls with their wide-spreading spray call us, and so does the romantic pass, all rocks and trees and ferns. Then, avoiding Meiringen, we find our way through the amazing gorge of the Aar to Innertkirchen. A good night's rest fits us for the long ascent of the monotonous Genthal next day. Next morning the mist clears as we pass the beautiful Engstlen Lake, with its glorious lights and shadows, and the majestic Titlis Mountain comes well into view as we reach the summit of the Joch Pass and begin to descend the steep paths through woods towards Engelberg. We rest for the night at the Hotel Hess, where climbers often stay before starting for the top of Titlis. We much wish that we could see the view from there, for it takes in all the Alpine mountains from Savoy to the Tyrol, and away to North Switzerland and South Germany.

We give but a passing look at Engelberg in its green valley and at the huge abbey, and then take the train down to the valley so famous in Swiss history, leading past Stanz to Lake Lucerne. But our stopping-place is Dallenwil, a little roadside station, from which we mount and mount by a bridle-path for three hours and more through woods and pastures. Over a rushing river we pass and then up a very steep, bare hill, till at last we reach Nieder Rickenbach. There is no road for carriages, so the only way to get there, if one's feet are not strong enough, is on mule-back—or to be carried in a chair, like a Guy Fawkes, by two men.

A YOUNG GOATHERD

The luggage, the food, the furniture, everything has to by thus carried up. We are glad to see our portmanteaus awaiting us, and to settle down for a week to explore the beautiful neighbourhood and enjoy the delightful quiet and comfort of the hotel, and the views in every direction. One treat we have is the entertainment given by the children staying for their holiday in the convent close by. There are piano duets by the nuns, action songs and recitations by the children, and charming singing led by a dear old father, who beamed round on the children and the visitors in the kindest way. And we have fine times exploring, losing our way and finding it again, watching the children keeping the cows together, the nuns making hay, wearing hats above their veils, adding to our flower and photograph collections, and all the time breathing the purest and most invigorating air possible.

A MOUNTAINEER WITH A CAPTURED EAGLET

All too soon the day comes when we must start again, posting the luggage to Gersau, on Lake Lucerne, and, with knapsacks once more buckled on, we climb the hill behind Nieder Rickenbach, and from the top look down to the great blue lake below, and to others glittering in the distance; to the Rigi and Pilatus—grand heights, though not snow giants. And then we drop down and down to the lake, where we take a steamer across to Gersau, our headquarters for the rest of our holiday. How we enjoy watching the lovely changes on the lake, the steamers, the boats full of apples, the reflections of the moon and stars by night, the sunrise and sunset! We find endless beautiful walks both level with the lake and high up on the wooded slopes above it. Many little trips, too, we take by the steamers, and then climb to spots famous for their views. Our longest and last trip is to the very end of the lake, and then by train to Goeschenen, by the railway so wonderfully engineered, rising by circular loops and tunnels to the levels required. As we have always longed to go in a real Swiss coach, which looks like three carriages built into one, we take the Ober-Alp coach from Goeschenen. We get a glance into the black mouth of the tunnel that pierces the heart of the great central mountain mass of St. Gothard, rumble over the Teufels Bridge, and past the interesting fortifications which guard the passes. We meet the soldiers returning from their practice in carrying guns in pieces on mule-back up the steep hills—all for defence, not attack. And the coach with its five horses rattles on past Andermatt, then up and up by zigzag roads, backwards and forwards dozens of times. The view looking back becomes more and more magnificent, and at last the lake at the top of the Ober-Alp Pass is reached. Then we scramble down, rather stiff, to stay the night at the little hotel. The horses now have a descent as steep and long as the ascent we have just made, to the lovely Val Tavetsch, through which the infant Rhine starts on his long journey to the distant North Sea. It is to see his very beginning, for we are Rhine lovers, that we have come to the Ober-Alp; so great is the disappointment next morning when we find it raining hard. However, we decide to try; and we do a stiff bit of climbing to within five minutes of the little Toma See, or lake, called the "source of the Rhine." Then suddenly there sweeps down upon us a thick mist, wrapping us round with cold, wet arms and blotting out even the rocks and trees that are nearest. So there is nothing for it but to beat a hasty retreat, walking as carefully as we can. We get dried at the hotel, and take the coach back to Goeschenen and thence back to Gersau, to find the lake a mass of glittering purple and gold under a stormy sunset. Two pouring wet days help us to feel less unwilling than we were to leave the beautiful holiday country, already withdrawn from our eyes under a mantle of grey mist; and so we start in the steamer from Gersau to Lucerne. For, in any case, we could not leave without at least a glance at Lucerne. Fortunately, the weather clears by next morning, and so we can walk on the quays under the chestnuts, and enjoy the views on the lake, the pleasant bustle, the rushing green torrent of the Reuss as it pours out of the placid lake. The old bridges with roofs interest us much, also many beautiful old houses, with their signs hanging out, as was the custom in the Middle Ages. We see, too, the famous dying lion hewn out of the rock, his paw sheltering the lilies of France; and we recall the tragic story and the bravery of the Swiss Guards defending the Tuileries to the death. Some of us would like to linger long among the shops—so much is there tempting—for presents to take home in the shape of silver jewellery, painted ivory flowers, and the ever-charming carvings of our little brown friends at Berne. But, as usual, there is a view that must be seen. Electric and cable tramways take us quickly to the Sonnenberg, a height behind Lucerne, where we spend a lovely afternoon saying good-bye to the lakes and mountains which we have grown to love so well. Then comes the final start, from Lucerne, for home, and as we go we make plans for next year—plans for seeing the Holbein drawings at Basel and the old houses at Lucerne, and for continuing the journey in the Ober-Alp coach.

(2) A VILLAGE STREET

(1) THE VILLAGE FOUNTAIN

(1) A SWISS REAPER

A GIANT ALPINE HORN

(2) A LITTLE LACE-MAKER

Copyright by Underwood & Underwood, N. Y. (1), and by H. C. White Co. (2).

CONTINUED ON PAGE 5711

MARKING RUBBER ON A RUBBER PLANTATION IN BOLIVIA, SOUTH AMERICA

CONTINUED FROM PAGE 5592.

RIDING ON WHEELS OF AIR

THE STORY OF A BEETLE AND A RUBBER TUBE

A LITTLE beetle has changed the world. If there did not exist a certain wood-boring beetle which trees and creeping plants hate, there would be no motor-cars in the world, no bicycles, no waterproofs, no telegraph cables under the sea. It is because certain trees and plants have the power to make themselves objectionable to insects that we are able to obtain one of the most wonderful materials in the world—indiarubber. What, then, is this wonderful substance, which means so much to men and is so important for the future of the world ?

It is simply a resinous, milky substance contained in rubber plants and trees. These trees live in hot, damp, tropical forests where there are swarms of wood-boring beetles. Now, instead of having ants to protect them, as some trees have, and instead of being armed with bristles or thorns, as so many trees are, these trees have a poisonous, sticky juice. As soon as a beetle thrusts its boring weapon into the bark, the tree pours forth this juice.

It kills the insect, and at the same time fills up the wound which has been caused. If the substance dried hard, like clay or putty, it would be forced out of position when the tree was blown to and fro by the wind. That would leave the wound open, so that beetles might again attack it ; while the spores of deadly fungus might find a resting-place in the wound, and gradually kill the tree. Therefore this juice, when it dries, is elastic, and no matter how the tree sways in the wind, it still holds itself in place, safeguarding the tree against further injury from the wound which the wood-boring beetle has caused.

Now, it was not the wise people of Europe who first discovered that this substance which protected the tree from insects might be useful to man. Columbus found the Haytians playing with balls made of this substance when he first went forth to discover America. And a traveller, named Torquemada, noticed, four hundred years ago, that the Mexican Indians used the same substance for making their cloaks waterproof.

The substance which was to work wonders in the whole world was first found in America, and used for the very purpose to which children still put it ; indiarubber was a rubber and nothing else. Somebody discovered that it would remove pencil-marks from paper. When introduced into England, about 1820, seventy-five cents was charged for a piece half an inch long. Artists used it, and were glad to pay that sum, for the rubber was invaluable to them for removing false marks from their sketches. Charles Macintosh, a thoughtful Scotsman, was the first in that country to put rubber to the use which the Indians had made of it; he used it to give us the first waterproof coats, and called them macintoshes, after himself. Then it was discovered that rubber, which would withstand the effects of water, could not be penetrated by gas, and that the majority of other liquids, in addition to water, could not make their way through it. So surgeons had it made up into tubes. But the great discovery was yet to come.

In its natural state, rubber becomes solid under the influence of cold, and soft and sticky under the influence of heat. An American named Goodyear, was the first to discover that all this could be altered by adding sulphur which has been melted by heat. He mastered the process which is known as vulcanising.

By vulcanising we can convert pure rubber into a substance resembling ebony. The black discs of which the gramophone records are made are of vulcanite; so are the black mouth-pieces of tobacco-pipes, the trays which we use for the acids in photography, and so are a thousand other things which we use every day. But there is another form of vulcanised rubber, the soft, of which we can make almost anything—casing for cables, springs for motors and carriages, buffers for railway trains, door-stops, springs, bouncing balls, and so forth.

The common indiarubber plant of our conservatories

For ten years Goodyear worked at the task of perfecting his invention, and sadly did he suffer from the scoffers at the time. He conquered in the end, after bitter suffering and poverty, and by 1844 he was triumphant. At about the same time a man named Thomas Hancock was at work on the same idea in England, so that two different men, in different parts of the world, were working at the same scheme at the same time.

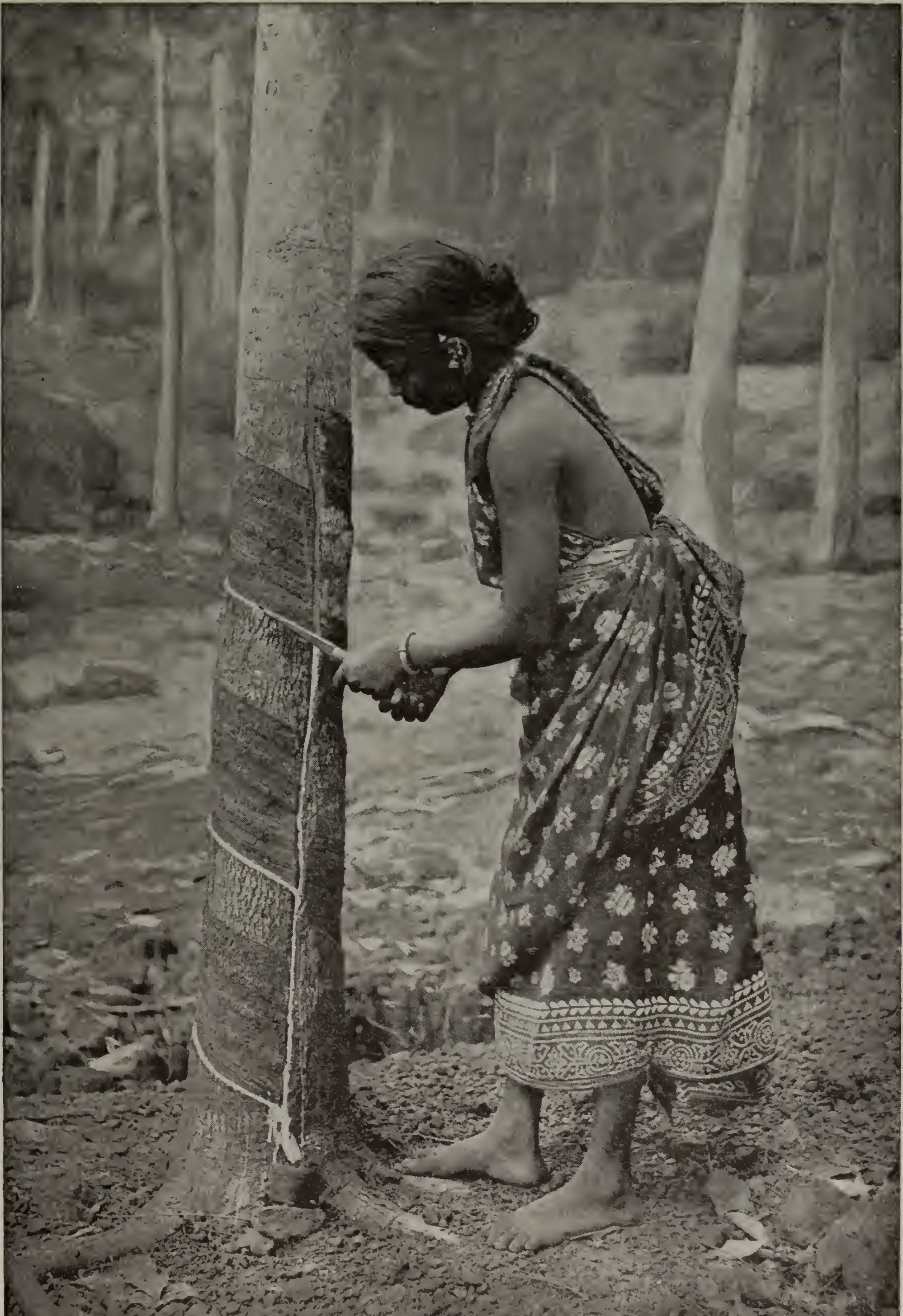
It was this newly-treated rubber which first made cycling possible. There had been cycles long before—hobby-horses, bone-shakers, and other dreadful things of the same style. The rubber tire gave them new form, new life and dignity for the first time. But, as those of us who are old enough to have ridden the old, tall bicycles, or the first "safeties," will remember, the first rubber tires were small and solid. How they jolted and jarred along the stony highways, carrying the rider home with his teeth aching and his wrists almost shattered! Motor-cars could never have run with tires of this sort, for the bumping over even the very best of roads would simply have shattered the engines to pieces in a very short time.

Happily, in the last quarter of the nineteenth century, Mr. J. B. Dunlop, of Dublin, thought out the grand idea of making an air cushion for a bicycle tire. He was a long time working at it, and at first he fitted one on a block of wood, and trundled that about his yard. It answered all right, so he made and fitted a tire of this sort to his own bicycle, then put one on the machine of his son, enabling the boy to win a race for which he had entered. The principle of the first Dunlop tire was the same as that which makes a motor-car or bicycle ride so delightful to-day. The inner tube is made of comparatively soft, thin rubber. It is that which we blow up with wind. The cover which fits over that is stout and hard. That simply serves to protect the inner tube from injury. It is that tube filled with air beneath the cover which has worked the marvel. The wheels of the bicycle or car actually run on the compressed air in the pneumatic tube.

The invention of Mr. Dunlop was taken up by a keen man of business, Mr. Harvey Du Cros, whose two sons became famous cyclists, riding the new tire. To-day there are in our own country many, many thousand cycles with these tires, and also many thousand motor-cars. But the invention has gone all over the earth. In every civilised country there are cycles and motor-cars using these wonderful tires. This little tube of air has made perhaps the greatest revolution of modern times. Places where there are no railways are now visited as easily as if Ariel had given us his wings.

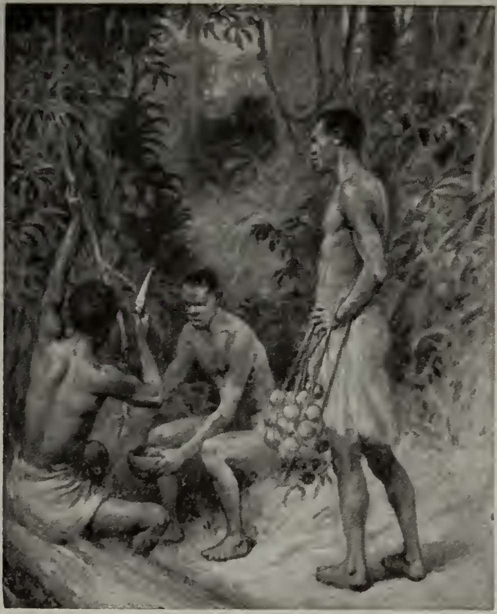
THE NEXT FAMILIAR THINGS ARE ON PAGE 5695

DRAWING MILK FROM A TREE TO MAKE RUBBER

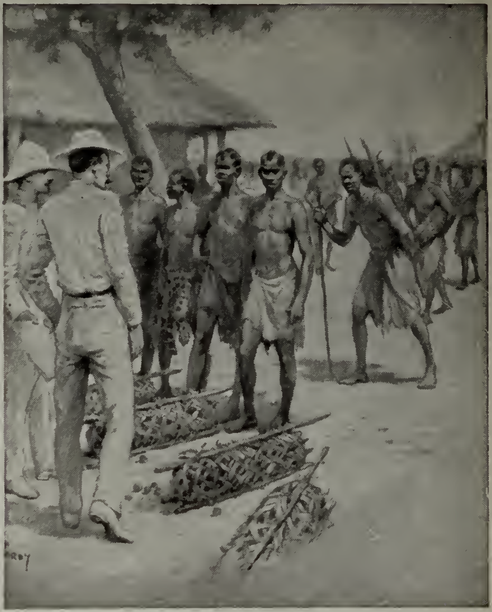


Here we see a native girl tapping a rubber tree in Ceylon. Holes or grooves are cut in the trunk of the tree, and in a few hours milky juice flows out and is caught in basins or tins. A good tree yields about twenty gallons of juice in a season, producing forty pounds of rubber. The juice is called caoutchouc, which is a native American word.

GATHERING RUBBER IN AN AFRICAN FOREST



Huge quantities of rubber come from the Congo Free State and other parts of tropical Africa, and here we see natives tapping the trees, while others are picking the fruit, from which to obtain seed for planting fresh groves of rubber trees. Much of the rubber that comes from Africa is obtained from climbing shrubs.



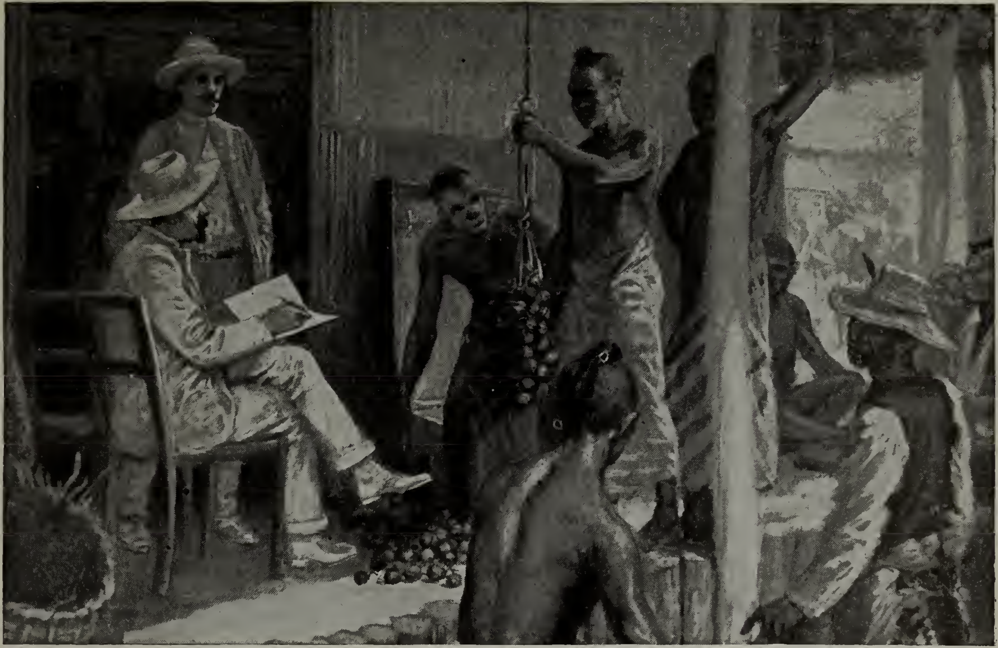
If the juice is allowed to stand for a time it becomes more or less solid, and the natives then roll it into little balls. In this picture the negroes are bringing the balls of rubber that they have prepared to the European traders for sale. Rubber, when first brought to Europe, was called elastic gum, and a single inch cost over a dollar.

The balls of rubber have many impurities in them, and they are cleaned to some extent by being placed in a sack and beaten, as shown in this picture. Of course, on proper rubber plantations, such as those in Ceylon and America, the rubber is cleaned scientifically by boiling.

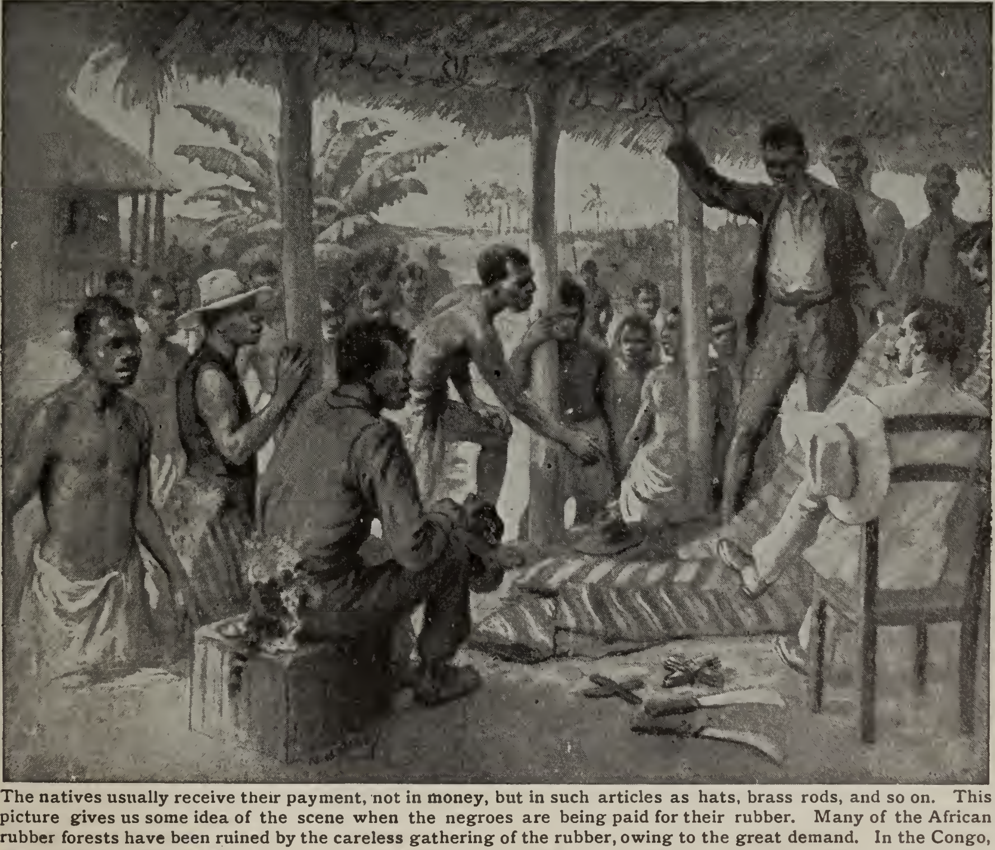
The rubber is next cut into slices, ready for proper drying before being sent to market. There are various methods of drying. Sometimes it is laid out in the sun or left upon racks, while at other times it is dried by fires **Some of these processes are shown on page 5682.**

The photographs on these pages are by Underwood & Underwood, and Suarez, Hermanos & Company

PAYING THE RUBBER MEN THEIR WAGES

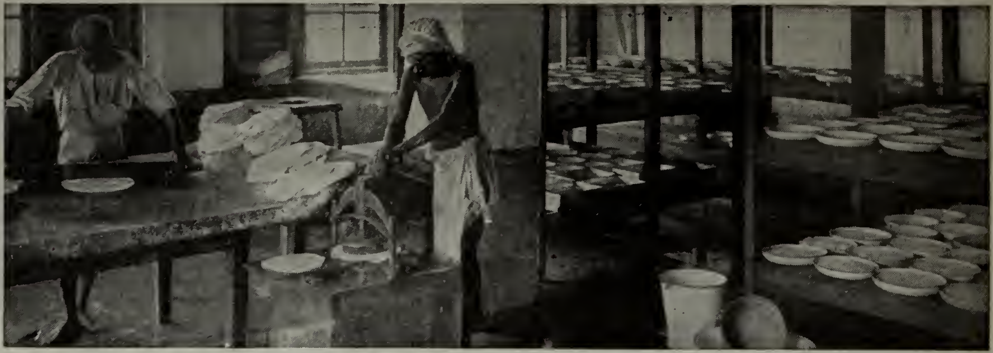


When the natives of Africa bring the rubber that they have gathered in the forests to the European settlements, it is weighed, and payment is made according to the quantity delivered. Here we see the weighing of the rubber.

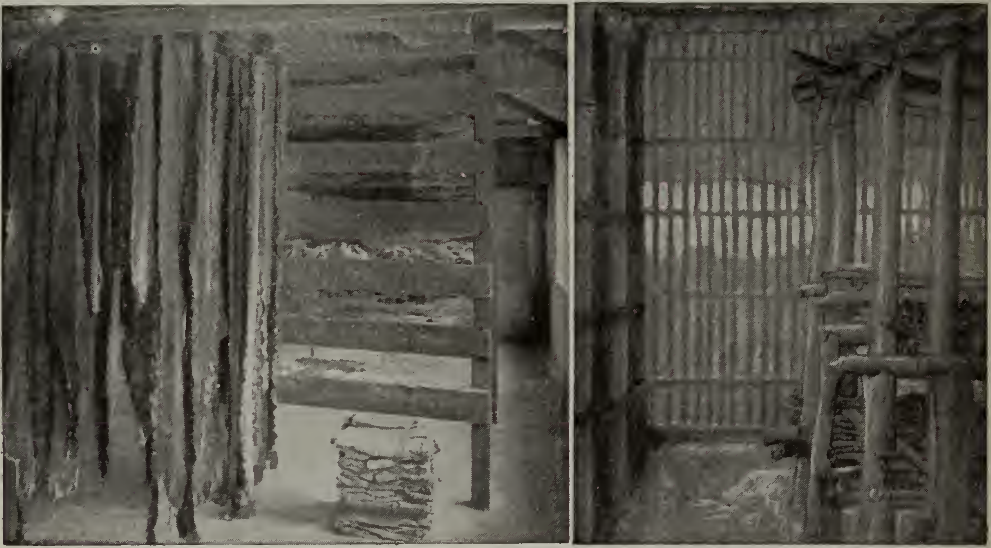


The natives usually receive their payment, not in money, but in such articles as hats, brass rods, and so on. This picture gives us some idea of the scene when the negroes are being paid for their rubber. Many of the African rubber forests have been ruined by the careless gathering of the rubber, owing to the great demand. In the Congo, the forcing of the natives to collect rubber has been accompanied by terrible cruelties on the part of their rulers.

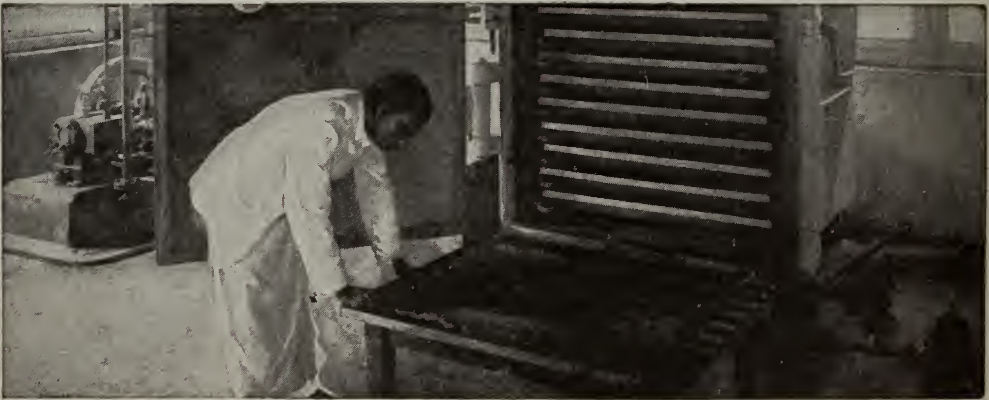
PREPARING THE RUBBER FOR USE IN CEYLON



Every country has its own method of preparing the rubber for use. The most scientific methods are used in America. Here we see the inside of a rubber factory in Ceylon, where the material is being rolled out by natives after the juice has become solid. The basins standing on the right contain caoutchouc that is getting hard.

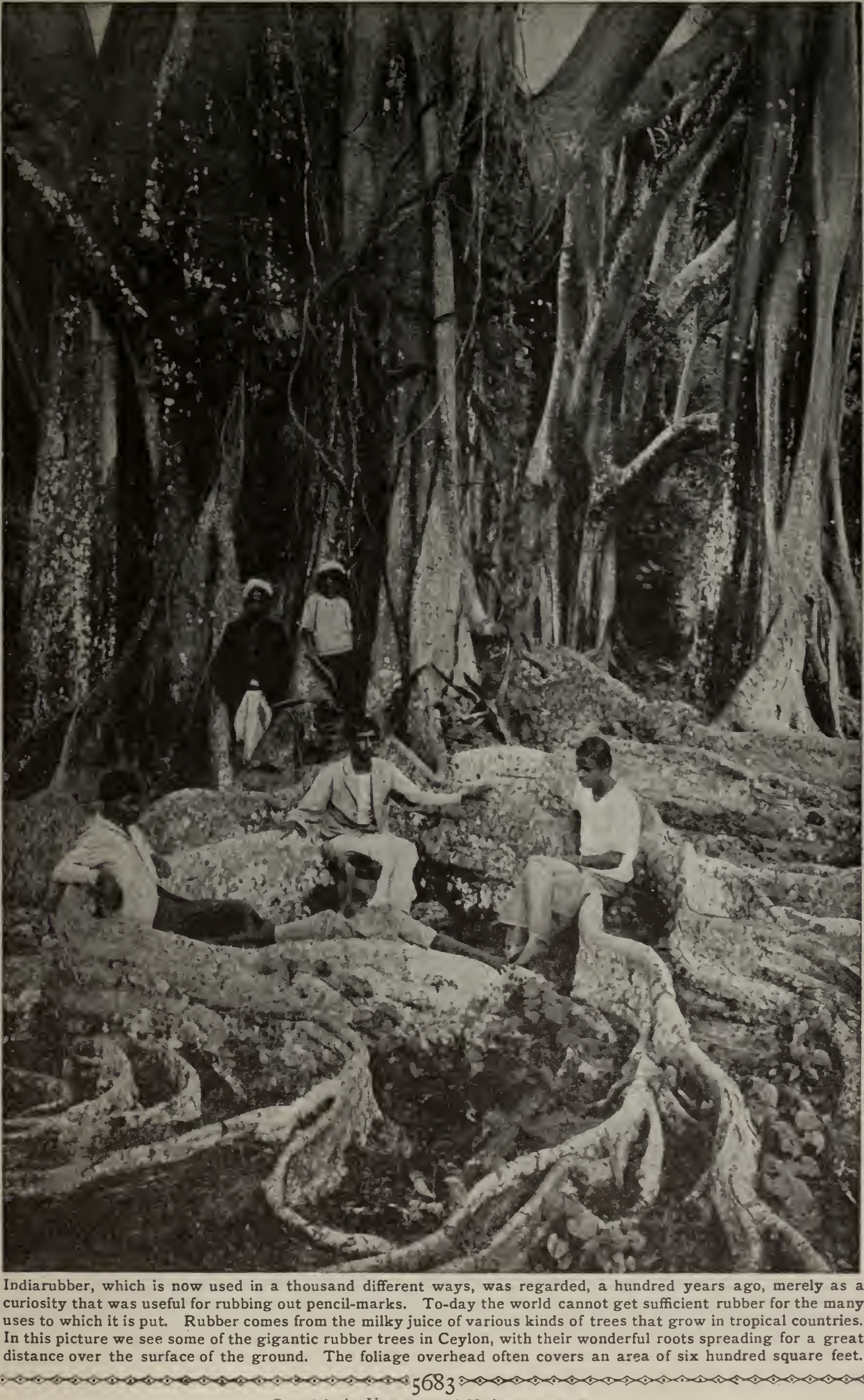


The picture on the left shows a drying-room in Ceylon, the rubber, which has been cut into strips, being allowed to hang up until it has dried in the ordinary natural way without artificial heat. On the right we see a corner of a drying-shed in Africa. The rubber is laid out on shelves until it is dry enough to take to the European markets for sale.



In this picture a method of drying rubber by artificial heat which is adopted in Ceylon is shown. The rubber is placed in ovens, and is, of course, dried very quickly. After various processes, the rubber is pressed into blocks and then cut into sheets or threads for use. Most of the rubber used to-day has sulphur mixed with it to make it more elastic and serviceable for use. This is called vulcanising the rubber, and the discovery of the process has been of the greatest importance to the world, for without it rubber could be used for very few purposes indeed.

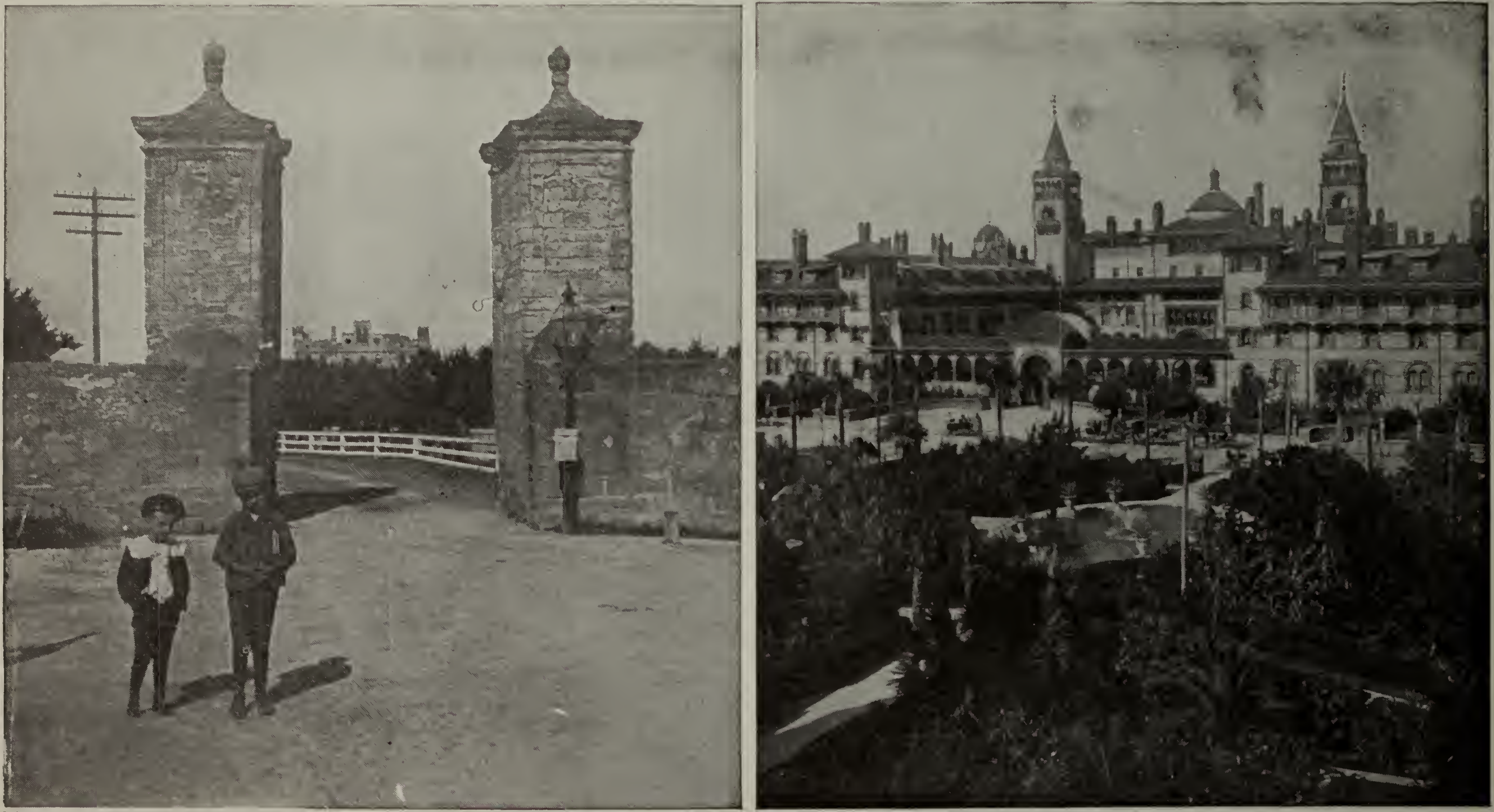
THE WONDERFUL TREES THAT GIVE US RUBBER



Indiarubber, which is now used in a thousand different ways, was regarded, a hundred years ago, merely as a curiosity that was useful for rubbing out pencil-marks. To-day the world cannot get sufficient rubber for the many uses to which it is put. Rubber comes from the milky juice of various kinds of trees that grow in tropical countries. In this picture we see some of the gigantic rubber trees in Ceylon, with their wonderful roots spreading for a great distance over the surface of the ground. The foliage overhead often covers an area of six hundred square feet.

Copyright by Underwood & Underwood, N. Y.

THE OLDEST CITY IN THE UNITED STATES



Pictures copyright by H. C. White Co

You were told of the founding of St. Augustine in 1565, and that it is the oldest city in the United States. The picture on the left is the old city gate, which was built while Florida was still a possession of Spain. Near it you see telephone wires, a mail box and other signs of modern life. On the right is one of the great hotels to which thousands go every year to escape the cold of northern winters. There are many of these winter hotels in Florida, some of them very large.

HOW HIGH CAN MEN FLY?

CONTINUED FROM PAGE 5650.

It used to be thought that an aeroplane carrying a man could fly only very near the ground, because there are many reasons why that is easier. For one thing it is safer, and for another it might be expected that near the ground the changes in the wind would be less. Two much more important reasons depend on the fact that the air is denser near the ground. This means, in the first place, that less power is needed to keep the aeroplane up, whereas the higher it goes the rarer is the air, and therefore the less able is it to support anything heavier than itself. And, in the second place, it means that the oxygen which the engine of the aeroplane burns is less rare near the ground and more able to feed the engine and keep it going.

Nevertheless, it has been proved that the very lightest type of aeroplane can be flown at a height of four thousand feet, and one of those best able to judge declares that he could go more than twice as high. This has an important practical meaning, especially for all connected with the army. It means that, contrary to expectation, aeroplanes can fly so high as to be safe from anyone firing at them from the ground.

IS A BOX IN WHICH A CANDLE HAS BURNT LIGHTER THAN A BOX AND CANDLE?

When we burn the candle in the ordinary way, it seems as if something had been turned into nothing, because the matter of the candle disappears and there is nothing to show for it. If it were true that the candle turned into nothing when it was burnt, we should be in the presence of an utter mystery without any meaning. But it is just such an experiment as this that gives us the key to what really happens when a candle burns, that explains to us why it disappears, and, what is much more important, teaches us that we are utterly wrong in supposing that when the candle disappears the matter which made it is destroyed.

When we weigh the box, to begin with, we have to reckon with the box, the candle, and the air in the box; but when we weigh it a second time, the box remains the same, but the candle inside has vanished. Yet the weight is the same, and this means that the air or mixture of gases inside the box is heavier than it was before, and heavier by just the weight of the candle; no more and no less. The substance of the candle has combined with the gases of the air to form new gases. Nothing is lost, nothing is gained, and though there has been chemical change, we know that that does not affect gravitation, upon which weight depends; and so the weight remains the same.

WHY DOES A STICK SEEM TO BEND WHEN PUT INTO A POND?

We see a stick, as we see anything else, by the rays of light which come from it. These rays have certain laws as to how they travel. If they possibly can, they travel in straight lines. And so, if the stick is straight and we see it from end to end through one and the same thing, as when it is held in still air or in still water, the stick appears to be straight. If the air or the water be moving, we may not see the stick straight; but we shall never see it straight if we put it half in the water.

We can see this for ourselves with a stick in a pond, or with a pencil, which is a kind of stick, in a tumbler of water, which is a kind of pond, or in many other cases. The bend that we notice always occurs at the surface of the water. We see it best if we raise the tumbler and look at it sideways. We then see half the stick through air and half the stick through water. At least, that is what we might be inclined to say, but it is not quite the whole truth. We see the upper half of the stick through the air all the way, and there is nothing more to say about that; but if we think, we shall understand that the light from the lower half of the stick is travelling to our eyes first through water and then through air.

Now, the rule is that whenever light passes from one thing to another, as from water to air, or air to water, it gets bent; and so, though the part of the stick under the water appears straight enough when the water is still, it is bent at an angle at the part above the water. This sharp bending of the rays of light in such cases is called refraction, which really means breaking.

HOW WAS IT DISCOVERED THAT THE SUN IS BIGGER THAN THE EARTH?

There are many distinct ways which all help to teach us the size of such a body as the sun. Of course, when we use such a word as bigger, it ought to refer strictly to size, but we might also be thinking of the amount of stuff or matter in the sun; in other words, there is the question of volume and there is the question of mass, and the study of each helps the study of the other.

We can learn the size or volume, of the sun by measuring the distance across its face. The mere measurement of the disc as it appears to us, however, would not, in itself, tell us any real fact: it would only convey the idea that the sun is about as large as the moon. But if we know the distance of the sun from us, we can work out its size from its distance and the size of its face as it appears to us.

We can study the mass of the sun by applying our knowledge of the law of gravitation. Gravitation does not in the least concern itself with mere volume, bigness, or size, but it concerns itself altogether with mass. When we know the law of gravitation, it will teach us the mass of any heavenly body of which the attractive power can be measured, because we know that that attractive power depends exactly upon the mass of the body in question, other things being equal. In this way the mass of the sun can be learnt, and even the mass of dark stars, far away in space, of which we are able to know the existence only because the movements of other stars are seen to be disturbed by their gravitation.

WHY DO SOME NOTES IN MUSIC AGREE AND OTHERS MAKE A DISCORD?

It is now possible to count in each second the number of waves that make a musical note. When we study in this way the notes of a chord of two or more notes that agree and are harmonious, we find that the proportions between the numbers of waves in a second are always very simple. The chord that satisfies the ear best is made of notes that have, for instance, 400, 500, 600 and 800 waves in a second. It does not matter what the actual figures are at all, so long as the proportion between them is that between 4, 5, 6 and 8.

But a chord which we dislike and call a discord is made of notes that have, perhaps, these numbers of waves in a second—400, 477, 701, 835, or any other numbers that do not have a simple proportion to each other. Thus not very many harmonies are possible, but the possible number of discords is infinite. But discords are very useful in music, for they add enormously to the value of the harmonies and to our pleasure in them when they come.

DO THE WICKED NEARLY ALWAYS TRIUMPH IN THE WORLD?

All sorts of things have been said on this subject. For instance, it is said that "Honesty is the best policy," as if to mean that it is the best policy for this world, and that the honest man will always triumph over the knave. On the other hand, many men in certain kinds of business declare that it is quite impossible to make a living if one is honest. They teach, indeed, that honesty is the worst policy in ordinary life. Ages ago the author of one of the Psalms declared that, though he was old, he had never seen the righteous forsaken, nor his children begging bread. In the modern world we see this every day, just as we also see righteousness prospering. And we see one dishonest man, perhaps, the richest man in the world, and another going to penal servitude for his dishonesty.

There is no rule. So many things, of such various kinds, made for triumph in this world that being good or bad may seem to work either way in turn. But goodness is worth while, because triumph in this world is worth nothing in itself, and goodness is worth everything in itself. So, in a higher and deeper sense of the word, and in the things that are really the most important, honesty is the best policy.

AS PART OF THE WORLD FACES DOWN, WHY DOES NOT THE SEA FALL OUT?

This is a very natural question to ask until we remember what our earth is. It is a ball in space, with infinite distances on all sides of it. In these distances there are real directions, of course—there is north, toward which the North Pole of the earth points, and south, east, and west. These terms have real meanings, but so far as the great universe is concerned, up and down have no meanings at all. From our point of view, New Zealand is facing down, and it is always facing down, even though at 12 o'clock noon and 12 o'clock midnight we and it have changed places; and, from the point of view of New Zealand, we are always facing down. Each of us is just thinking of his relation to the earth, and our words have meaning simply and solely in relation to the centre of the earth.

Now, the centre of the earth is always down from New Zealand or from us at any time of the day or night; and every part of the world faces up, for its face is turned away from the centre of the earth. The power of the earth's gravitation acts toward the centre of the earth, pulling everything down toward it. If we jump here the earth pulls us back; if a New Zealander jumps at the same time almost in the opposite direction, the earth pulls him back too.

When we think it out like this we can understand for ourselves why the sea does not fall out at any part of the earth's surface, and why there is no more reason for it to do so at any one point than at any other.

WHY DOES WATER SPLASH WHEN IT DROPS ON THE GROUND?

In order to answer this question we must first know why water forms drops at all. The answer is that there is a force called cohesion—or sticking together—which acts between the little molecules of the water, and holds them together in the round form that makes a drop. Now, when the drop falls upon the ground it is broken up, and this can only mean that something has overcome the force of cohesion between the drops, and has pulled them apart with a greater force than that which held them together.

This force is to be found in the motion of the drop as it fell. When the motion of the drop is arrested, it cannot be lost or destroyed; it must turn into something. If the water had sufficient cohesion, and were elastic, the motion would be turned into motion in the opposite direction—the drop would bounce. But, instead of that, the force of the drop's motion is turned into the force that overcomes its cohesion and drives its different parts asunder.

WHAT MAKES THE WATER DRY UP IN HOT WEATHER?

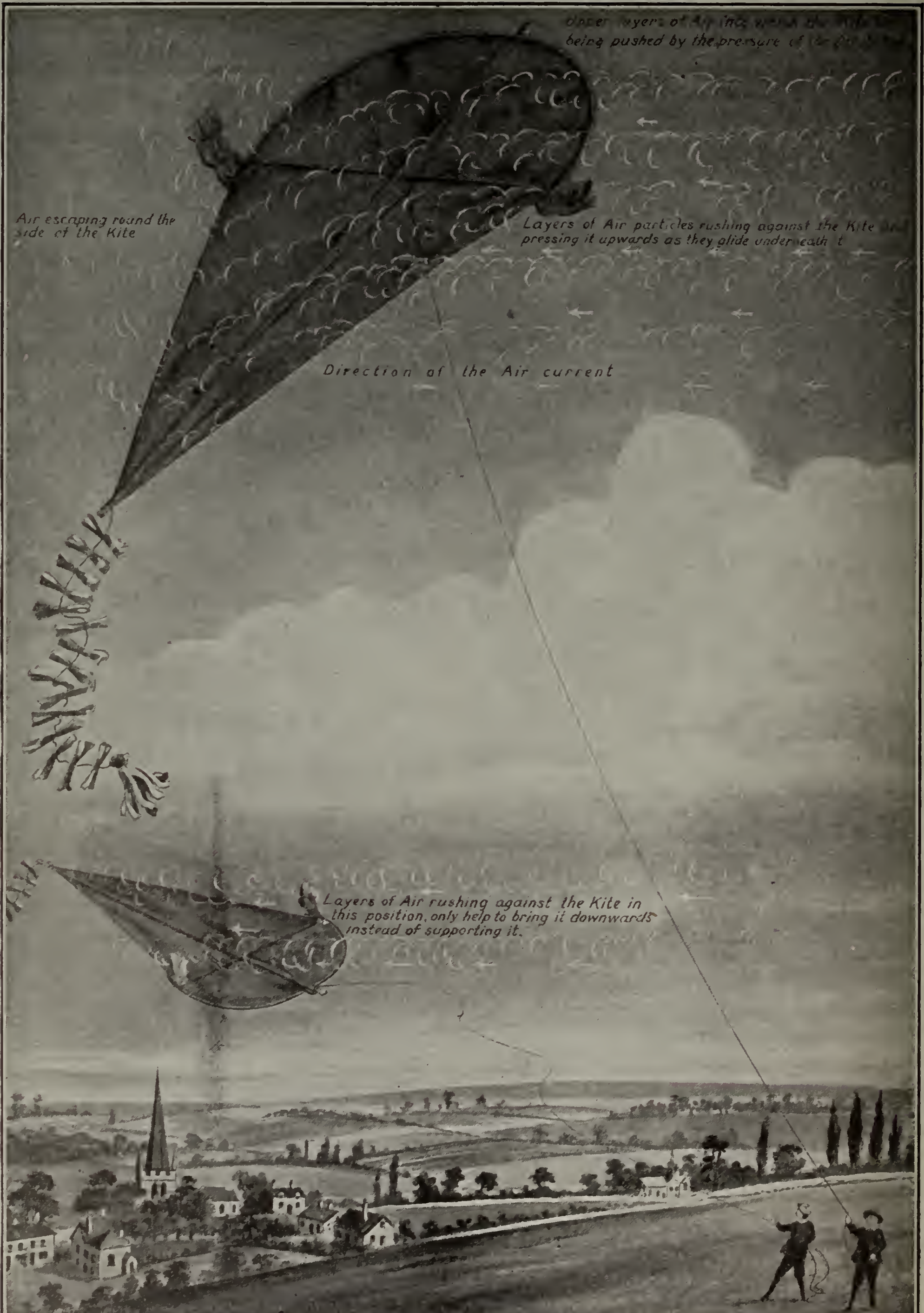
Whenever water or anything else disappears we know that it has not been made into nothing or destroyed, but has gone somewhere. In this case it is very easy to say where the water has gone. It has gone into the air; and exactly as the plate or the ground or whatever the water left is drier, so the air is wetter, whether we notice its wetness or not.

Our question then is, why does the water go into the air, and why especially in hot weather? Whenever water is exposed to an atmosphere that does not already contain as much water as it can hold, the water passes into the air in the form of water-vapour. We say that it evaporates. And the hotter the air is the more water will it hold, though so long as the air does not contain as much water as it can hold, water will evaporate at all temperatures, low as well as high.

Now, if anything happens to lower the temperature of the air when it is as full, or nearly as full, of water-vapour as it can be, the very reverse of what happened before takes place, and the water comes out of the air, perhaps as dew, perhaps as rain. And now we see why this may happen in hot as well as cold weather—that is, why it may rain in summer, as we all have opportunities of noticing every year.

CONTINUED ON PAGE 5787

WHY A KITE KEEPS UP IN THE AIR


Upper layers of Air into which the Kite [illegible]
being pushed by the pressure of the [illegible]
Air escaping round the side of the Kite
Layers of Air particles rushing against the Kite and pressing it upwards as they glide underneath it
Direction of the Air current
Layers of Air rushing against the Kite in this position, only help to bring it downwards instead of supporting it.
G. F. MORRELL

The air above the earth is in layers of different densities, and these are constantly moving in a horizontal direction. The string of a kite is so placed that the air can beat against the face of the kite and preserve it at an angle that allows the bulk of the air current to glide downwards. But this air, meeting the dense air below, is pressed up against the kite, which, when it is pushed, moves where there is least resistance—namely, upward through the thinner air. And so the process is constantly repeated. If, however, the string is fixed in the wrong position, or gets entangled, as with the lower kite in the picture, the kite is not maintained in its proper position, and it falls.

THE SEARCH FOR A HAPPY MAN

CONTINUED FROM PAGE 5656.

ONCE upon a time an Emperor of China yearned for the sight of one human being who was really happy.

"I am like the sun," he thought to himself—"like the sun, which only picks out the mountain-tops in gold, but whose beams shed no such splendour on the valleys below."

And having turned this matter over in his mind awhile, he bade his chief master of ceremonies lay before him the list of his civil servants.

The master of ceremonies bowed and departed, and soon afterwards returned, bringing with him 666 paper scrolls, each 66 yards long. And even these had barely room for all the names.

"What a formidable host!" cried the emperor, and then, pointing to a name in the list, he charged the master of ceremonies to find out what manner of man he was.

The emperor was wont to have his wishes carried out with lightning speed, and ere he had time to count 10,000, his messenger was back, and, with a very low bow, announced:

"The man whom your august Majesty deigns to ask about is Tun-Li, an old and trusted servant of yours. Honourable and discreet as an official, he is also a model father of a family."

"Then shall well-merited happiness be his portion," cried the emperor, "for I will gladden his heart with a glance of my eyes. Go, therefore, and tell him that I have vouchsafed to admit him and his family to pay homage to the Son of Heaven on the first day of the coming month."

"Assuredly Tun-Li will die of joy!" said the chief master of ceremonies.

"Nay, let us hope he may see and live," replied the good monarch, his features wreathed in smiles as he spoke. "And now go and make known my wishes."

"Well, what news?" he asked, when the master of ceremonies, having fulfilled his mission, reappeared.

"Your most sacred will has been done, almightly Son of the Skies," replied the other, falling at the emperor's feet. "Your gracious command has been communicated to Tun-Li, with the beating of drums and the flourish of trumpets, amid the loud acclamations of the people whose house your wisdom has exalted."

"And how did Tun-Li receive the tidings?"

"Sheer joy seems to have robbed him of his wits. Never before were such rejoicings witnessed upon earth!"

Like all things to which we look forward, the day for Tun-Li's audience seemed slow in coming, and the emperor grew weary of waiting, for he yearned to behold a happy man.

Wherefore, one evening, disguised as a common coolie, together with a companion, he wended to that distant quarter of Pekin where Tun-Li dwelt.

And while still afar off, his ears caught the noise of shouting in the house of Tun-Li.

"Can the rejoicings be indeed so great?" thought the emperor, astonished and delighted.

As he approached, the sounds grew clearer, and at last he distinguished words.

"O most wicked of wives, most despicable creature the sun ever shone upon!" shouted Tun-Li. "Accursed be the day and the hour when I wed you. Of a truth, evil spirits must have possessed me!"

"For three hundred moons have we been married," replied a woman's voice, "yet never till to-day has an angry word passed your lips. You always found me true, and never failed to praise me."

"Well, and what of it? Have we ever before been summoned to the dread presence of the emperor?" thundered Tun-Li. "But now you will cover me with disgrace—you will make me the laughing-stock of the city! What do you know of making the three-and-thirty graceful curtsies which etiquette calls for? O could I but move the earth to swallow me up for very shame of you—aye, of you and of our daughter!"

"Dearest father," sobbed Tun-Li's daughter, "have you not always said that I was your beautiful Mu-Sian?"

"Well, and what if I have? Words will not make your feet small and dainty. They are over seven inches long!" cried Tun-Li, sorely perplexed. "I am sure the emperor will die of fright when he beholds such a terrible foot!"

"O father dear, you forget that if my feet are not tiny, neither have I been brought up to be carried about in a sedan-chair," wailed poor Mu-Sian, in tears. "My feet at least serve me to walk with. And when my turn comes, I, too, shall be obliged to marry a humble and struggling official of your own rank. For have I not been trained to do work?"

"Enough!" cried Tun-Li.

Just then the gong sounded over the door, and a moneylender strode in.

"How now, Tun-Li?" he cried. "Have you thought over my terms?"

"If I agree to your terms, we must all die of hunger," hoarsely whispered Tun-Li, burying his face in his hands.

"Do as you choose, then!" retorted the moneylender. "But bear in mind that time is on the wing. Hesitate a little longer, and there will be no blue silk robe with gold-embroidered sleeves for yourself, no stitched silk dress for your wife, and no garment with lotus patterns for your daughter. You know my price; you must pay it or do without the things which you cannot dispense with if you are to appear before the emperor. What do you mean to do?"

"Have your way, then; I have no choice. I must do as you say," murmured Tun-Li despondently.

"Good! Let me again remind you, then, of the conditions, so that there may be no dispute later. I undertake to supply you with all you need for this Court function; you, on your part, will hand over to me three-quarters of your income on the first of each month."

"But we shall surely die of hunger, man!" cried Tun-Li, and smote his hands together in despair. "Take the half, and don't ruin us outright!"

Tun-Li, his wife, and their poor little Mu-Sian fell on their knees before the moneylender, and begged him to be content with half of Tun-Li's salary, adding: "And even then starvation will haunt us all our lives!"

But the man refused to yield.

"No; three-quarters of your income every month! That is my last word!" shouted the man. "And now yours must be either Yes or No. Which is it?"

And Tun-Li, his voice muffled till it could hardly be heard, answered:

"It shall be as you say."

"O heavens, what a scene!" muttered the unseen emperor, as he witnessed this misery in Tun-Li's home, and the tears coursed down his cheeks.

Then the emperor betook himself to his palace and donned his usual robes. And the chief master of ceremonies, dropping at the emperor's feet, began to address him, saying, "Almighty one."

"Let me never hear that name again," commanded the monarch, moved to wrath. "Can he be called almighty who is powerless to make one man happy?"

At this thought his eyes again grew tremulous with tears. And for all comment he made this sad reflection:

"I am indeed like the sun, which from afar illumines and warms, but when at too close quarters to the earth blights all things that live and thrive thereon."

A TALE OF A SHOP WINDOW

Miss Toinette lived in a glass house, in the midst of such beautiful things that every little girl who saw it flattened her nose against the glass, and wished she lived there too. To begin with, Miss Toinette had whole trunks full of beautiful clothes that came straight from Paris.

One trunk was full of dresses, lovely ones—some for mornings, some for afternoons, and others for evenings. They were made of the daintiest of silks and velvets and muslins, in all sorts of beautiful colours. There were hats, and bonnets, and cloaks, and tiny kid gloves, and silk stockings to match every dress. And the underclothes—why, they were so dainty that they looked as if they had been made for a fairy queen. And so they had—for a beautiful fairy queen named Toinette, late of Paris, but now of Chicago.

Now, Miss Toinette wasn't really and truly a lady, or a little girl, or a fairy queen. She was a doll, and the glass house in which she lived was the glass window of a great toy-shop in Chicago. She was such a stylish doll, and cost so much money, that even the mammas of the rich little girls shook their heads when the shopkeeper told them the price of Toinette.

MARJORIE GAZED AT HER PRINCESS

Someone else lived in that shop window, too; and when the shop was closed, and everything was quiet, a little grey mouse would c-r-e-e-p, c-r-e-e-p out of his hole, and run over and sit in front of Toinette and talk to her.

She could not talk anything but French, and would say "oui" and "non," which mean "yes" and "no," and "mère" and "père," which mean "mother" and "father," beautifully. But she could understand Mousie Grey, even though she could not talk herself, and she just loved to hear him talk of the outside world in his funny little squeaky mouse voice.

Among other things, he used to tell her about the children who came to the glass house, which was really the shop window, you know, to peep and smile at Toinette, who used to smile back at them. She could do this, you know, for smiles mean love, and happiness, and good wishes, whether they are in French or English. But one cold winter night Mousie Grey came in all out of breath, with a few flakes of snow on his soft grey fur.

"I tell you," he panted, "I'm all tired out. I've been a long way since I saw you last. You see, it was this way. For over a week—in fact, ever since you came to live in this window—I have noticed a little girl who comes every day, as often as she can, to look at you. She is a poor little girl—I knew that by her thin face and old clothes. Why, cold as it was to-day, she had on her head and shoulders only an old thin shawl, and her little hands were blue with cold."

Toinette looked as if she were going to cry, when she suddenly thought that she might spoil her complexion, so she controlled her feelings.

"Well," went on Mousie, "I wanted to see where she lived, and so this afternoon I followed her. Oh, but I had some narrow escapes from cats, but at last we reached the house." Two little tears, no bigger than the point of a pin, rolled down Mousie's little grey cheeks, and he went on:

"The house had only two rooms, and there was so little fire that I had to look twice to see it. The mother was sick in one room; not so very sick, but she needed good food and care.

"'Marjorie dear,' she called, with some anxiety, did you get the money?'

"'Here it is, mamma.' And she showed her mother a shining quarter.

"It seemed that the mother did sewing, when she could get it, but she had not had much work for a long time, and so they were very, very poor.

"'Now you lie right still, mamma,' Marjorie said. 'I'll soon have supper.' She put on a few sticks of wood, and the little tea-kettle was soon humming; and almost before her mamma knew it, Marjorie took her a nice cup of tea and a roll, with just the tiniest dot of butter.

"Marjorie herself had only a roll and a cup of warm water, with just a little milk in it. Almost before Marjorie had finished her own supper, mamma was asleep. Then the little housekeeper set the house to rights, and went to a box in the corner and took out her doll. And such a doll! Just an old clothes-pin dressed up; but the way she cuddled it up, and sang to Bella, as she called it!

"Well, I must run away and get a little sleep, or I sha'n't be able to sit up late to-morrow night to nibble the candy." And, with a funny little bow, away Mousie Grey ran.

The next morning Marjorie was up by daylight, for had she not a whole quarter with which to buy a little dinner? Poor little Marjorie! A quarter looked very big to her. As soon as she gave mamma her breakfast, and made everything as neat as a little girl could, she put on her little shawl, took the precious money, kissed mamma good-bye, and started out to hunt for great bargains. She could get a little meat for soup, half a dozen potatoes, a small loaf of bread, a little butter, and perhaps a nice orange for mamma. She hoped so.

"I will just peep at the Princess," she thought. "I wonder if she is still there. Oh, if anyone has bought you, my beautiful Princess, how lonely I shall feel!" she said, with a half-sob.

But no one had bought Toinette, for there she sat, smiling and beautiful as ever; and she looked out at Marjorie, saying, although no one heard her: "*Bon jour, ma cherie,*" which means, "Good-day, dear."

MARJORIE HEARD A LAUGHING VOICE SAY: "JESSIE'S RUNNED AWAY, DADDIE!"

Oh, how many people there were out on that day! Why, the pavements were crowded, early as it was; and as for the streets, it was very hard work to cross them, there were so many horses and vans and smart carriages out.

Just as Marjorie was looking at Toinette, making up stories in her own little head, about how the beautiful dolly was a lovely princess, and lived in a gorgeous palace made of gold, a carriage drove up.

It was drawn by two shiny black horses, and in the carriage a little golden-haired girl and her papa were sitting.

How different the two little girls looked, one in her velvet and ermine, and the other in her thin little dress, with the faded shawl!

Tenderly did the gentleman lift his precious little daughter to the ground, and, with a merry laugh, they went into the great toy-store, while Marjorie went back to fairyland, and went on weaving her story about Toinette.

She had just reached the place where the Princess was eating her dinner of chicken and honey off ruby plates, when she heard a laughing baby voice say: "Jessie's runned away, daddie! Jessie's runned away!"

And into the middle of the crowded street, in the midst of carriages, horses, and cars, she saw a tiny baby girl run. It was the little princess of the carriage, and with a white face her father rushed after her.

But, quick as he was, Marjorie was quicker, and with a swift rush she had run and seized Baby Jessie from under the very feet of some prancing horses.

How she and Jessie were bundled into that beautiful carriage she hardly knew. But she was driven home in less time than it takes to tell it; and there, in the poor little house, the mother was told all about how brave her dear little daughter had been.

And before he went, Mr. Webster—that was Jessie's daddie's name—had asked Marjorie's mamma to come and live in his beautiful home and help with the sewing.

"And now, if you can spare this little daughter for an hour, I think we will take her back to the store, for there is one more thing I want to buy," said Mr. Webster.

"If you were going to buy anything for a little girl in this great store, what would you choose?" he asked Marjorie, when they were at the store.

And Marjorie, with a little catch in her voice, said:

"The Princess."

The next night, when Marjorie and her mamma went to Jessie's house, there sat Toinette on a great high chair!

And when Mr. Webster lifted her down and gave her to Marjorie, Marjorie just opened her arms and hugged Toinette up so close that Mousie Grey, who had again made a dangerous journey, laughed and ran home happy, knowing that at last Toinette had found the right mother.

THE BOY WHO LOST HIS SHADOW

As a little black boy was standing in the sunlight by a pool, his shadow fell on the water and disappeared. He went home without knowing what had happened; but he was very restless, and could not eat or sleep. Fearing that he had fallen ill, his mother watched over him, and when he arose at daybreak and crept out of the house, she followed him quietly.

By the time he reached the pool the sun was shining clearly, and his mother then saw that he had lost his shadow, and she knew that the shadow-eater must have taken it. He was about to jump into the water, but she stopped him, and carried him home, and let him go out only on moonless nights when he did not feel the loss of his shadow. But how was she to get his shadow back? That was what puzzled her. At last she made a clay figure, and stood it by the pool one sunny morning, and let its reflection fall on the water. The shadow-eater tried to seize the shadow, but as it was not the shadow of a living creature he was unable to capture it. He was filled with fear, and began to think that the woman was a witch who had destroyed his powers for all time.

HE WAS ABOUT TO JUMP INTO THE WATER

"Give me back my boy's shadow, and I will leave you in peace," said the woman to him. The shadow-eater, who was in a terrible state of fear, at once gave her what she wanted, and then, being afraid that she would do him more mischief still, he left the pool, and was never seen there again.

THE MAN WHO DROVE DOWNSTAIRS

On a high hill on the west bank of the River Danube stands the Royal Palace of the kingdom of Hungary, surrounded by the ancient city of Buda, and looking across the river at the twin city of Pesth. These two cities were united in the year 1873, and we know them as Budapesth, the capital of Hungary.

In a splendid mansion hard by the Royal Palace there lived, in the beginning of the nineteenth century, one Count Sandor, a nobleman who was the proud owner of a large number of the finest horses in the country. The Hungarians have always been famed for their skill as horsemen, but Count Sandor excelled his fellow-countrymen in riding and driving his splendid steeds.

Eccentric and reckless, the count would engage in the most daring and dangerous feats, forcing his horses to plunge down from rocky heights, and to clamber up almost perpendicular cliffs. When the ice of the Danube was breaking up he would cross the river from shore to shore, jumping from ice floe to ice floe. Leaping fences and walls, streams and chasms, was as nothing to this intrepid rider, and he would even leap over moving carriages at a single bound.

THE COUNT DROVE HEADLONG DOWN THE STEPS

The guests of Count Sandor had need to be fearless, too, for they never knew on what strange coaching expedition their host might take them, or what strange pranks his horses would play them ; for the count trained his horses to send their riders flying over their heads, a most unpleasant, and often dangerous, surprise for inexperienced riders. One of the count's most reckless exploits occurred one day in the year 1827. Accompanied by a German artist, named John Presstel, and a footman, he set out from his mansion in an open carriage drawn by four of his finest horses. The winding street leading down from the rocky citadel ran past a steep flight of stone steps, which had been built to save the dwellers in the lower town a long, winding journey up to the centre of the town. Suddenly as they were about to pass the head of this staircase, the count turned aside the leading pair of his four-in-hand, and drove team and carriage and all headlong down the stone staircase. Artist and footman held their breath, and clung hard to the sides of the carriage as the wheels bumped down the hard steps, wondering, doubtless, if the wheels would stand such a succession of violent shocks, and amazed at the hardihood of the driver. He, calm and collected, skilfully guided his horses, and the strong and sure-footed animals held on their course, and reached the street below without accident. Only when the roadway had been safely reached, and the four splendidly trained animals were prancing gaily along the level ground once more, did the two passengers breathe freely. The artist, John Presstel, often sketched the daring feats of horsemanship of the count, and he added a sketch of this incident to the collection of curious and striking pictures, which has been preserved for many years, and is now known as the Sandor Album.

CONTINUED ON PAGE 5877

THE BOX THAT SPEAKS TO US

CONTINUED FROM PAGE 5683

In a little room in London, with a row of ugly windows looking out on the dripping telegraph wires and the smoky roofs and chimneys of the City Road, is gathered a company of people. One is the great singer, Madame Melba; another is the celebrated violinist, Herr Kubelik; a third is the famous accompanist, Mr. Landon Ronald.

One of the walls of this room is a partition of wood and frosted glass. In the centre of it a brass trumpet projects into the room. Close to this trumpet there is a tall stage of rough wood, and on this stage stands a cottage piano.

Mr. Landon Ronald climbs to the stage, and seats himself before the piano. Kubelik places his violin under his chin; Madame Melba stands in front of the trumpet. All conversation ceases. Everybody is very still. Then a bell rings.

Mr. Ronald begins to play the piano. In a moment Madame Melba is singing. Presently the violin of Kubelik sends its glorious tones mingling with the voice and the piano. What is happening?

All these *movements*—the movement of Melba's lips and throat, the movement of Mr. Ronald's hands, the movements of Kubelik's bow—are passing from this little room in the city of London into the distant ages of the future. The people in the room hear them, but it is only for a swift moment; they rush on, like an arrow, like a train flying through the country, away from To-day, away from the Present, into the invisible and unknown world of To-morrow and For Ever.

These movements of which we have spoken have an effect upon the atmosphere. If a person sweeps a fan in front of our face, we feel on the skin a motion of the air. The movement of the lips has an identical effect; they set up a motion in the air, they make the air vibrate. When Melba's lips form the word "Home," they send not that printed word into our ears, but only vibrations of the air, vibrations of sound; and in our own minds we convert these vibrations of sound into the word "Home."

And now to-day all the vibrations of sound made by the singer's voice, the violin, and the piano, mingle in one continuous and varying undulation, enter the brass trumpet, as well as the ears of the little listening company; and the trumpet receives on the other side of the partition a force of sound which moves a silver needle exactly as the vibrations move the drum of the ear. The little silver needle at the end of the brass trumpet moves with the waves of air, and its movements are the movements of a writer. That needle is the secretary of posterity. It is writing down the song for people not yet born—people who will live in five hundred or a thousand years. If there had been gramophones in the earliest ages, we might now listen to the movement of Homer's lips, and hear the passionate cry of John the Baptist: "Repent, for the kingdom of heaven is at hand!"

Under the silver needle there is a revolving plate made of some wax-like composition, which receives in almost invisible lines the pressure of the needle's point. When the song is finished, or the needle ceases to move, the plate is taken from under the needle, and carried to skilful workmen, who copy the spider lines of the needle on a diagram of metal. This metal diagram is the master-record; from this may be made as many copies as are needed. In a thousand years' time men and women will pay to get copies of it.

When the song which the people listen to in the City Road, this foggy morning, has been *transferred*—think of it!—from the composition plate to the metal diagram, and conveyed from the metal diagram to the vulcanite record which we may buy for a few quarters—it will be placed, in all the cities of the world and down all the ages yet to be, on the machine called a gramophone, and will be reproduced exactly as it was sung.

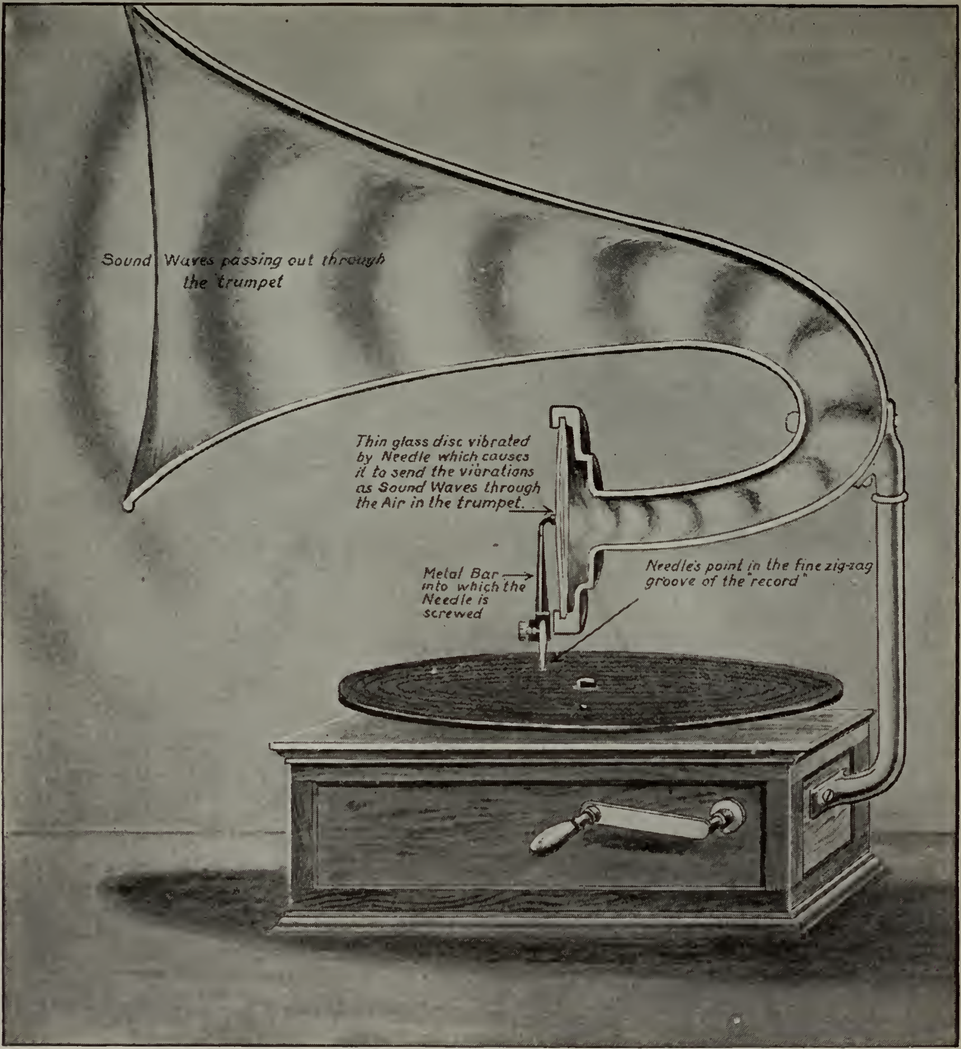
A little needle will pass over the disc as it revolves on this machine, the scratches on the disc will set the needle vibrating, the vibrations will strike upon the tiny mechanism just above the needle called the voice-box or sound-box, and, leaving the sound-box, these vibrations will issue from the trumpet as the very song sung in the City Road.

Words will come from the trumpet!

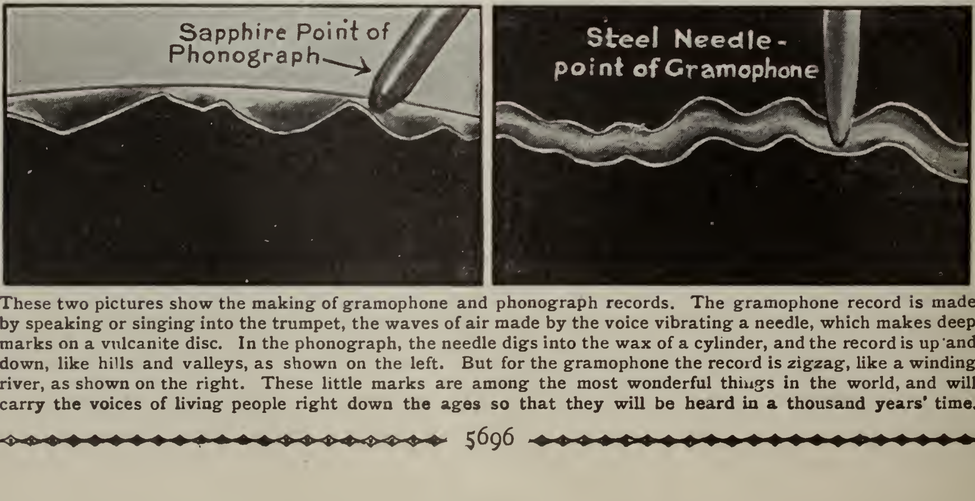
The wonder of this fact is overwhelming to our understanding. It is a miracle. How is it that the dead mechanism of that simple sound-box converts these vibrations, these little hurried jerks of the needle, not merely into sounds, but into actual *words?*

It is a thing that no man knows.

THE MACHINE THAT TALKS AND SINGS

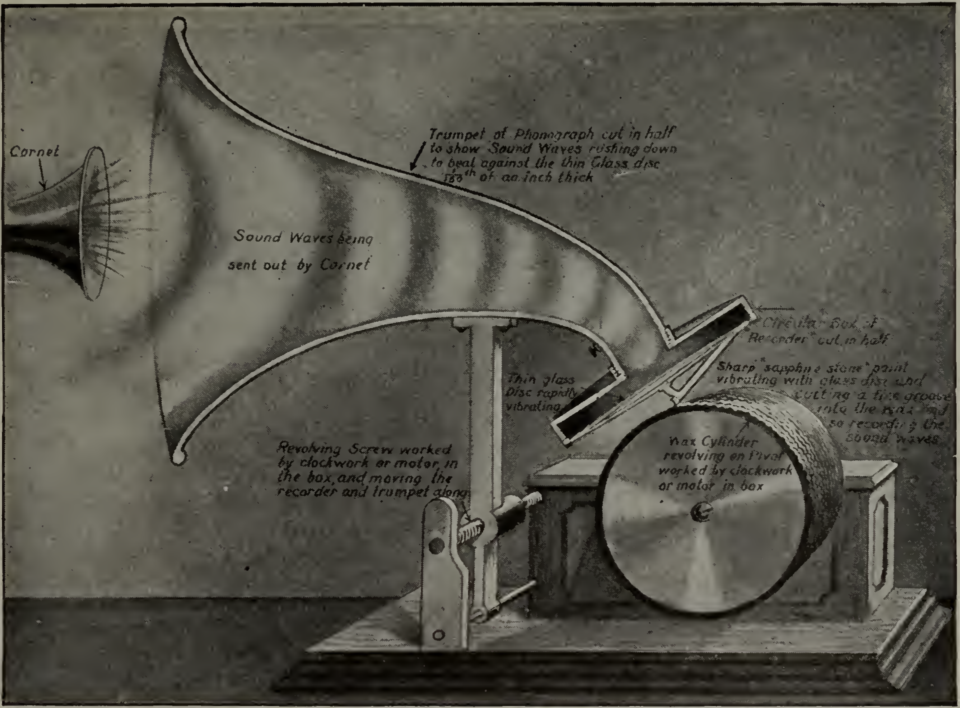

Sound Waves passing out through the trumpet
Thin glass disc vibrated by Needle which causes it to send the vibrations as Sound Waves through the Air in the trumpet.
Metal Bar into which the Needle is screwed
Needle's point in the fine zig-zag groove of the record

A box that can talk seems a miracle ; yet we have all heard a box speak. The pictures on these pages show how it is done. This picture shows the gramophone talking. A little needle moves in the zigzag curve of a disc made of vulcanite, and as the needle vibrates it shakes a glass disc and sends into the trumpet waves of air corresponding to the sounds of words. The best gramophones are now being made without trumpets.

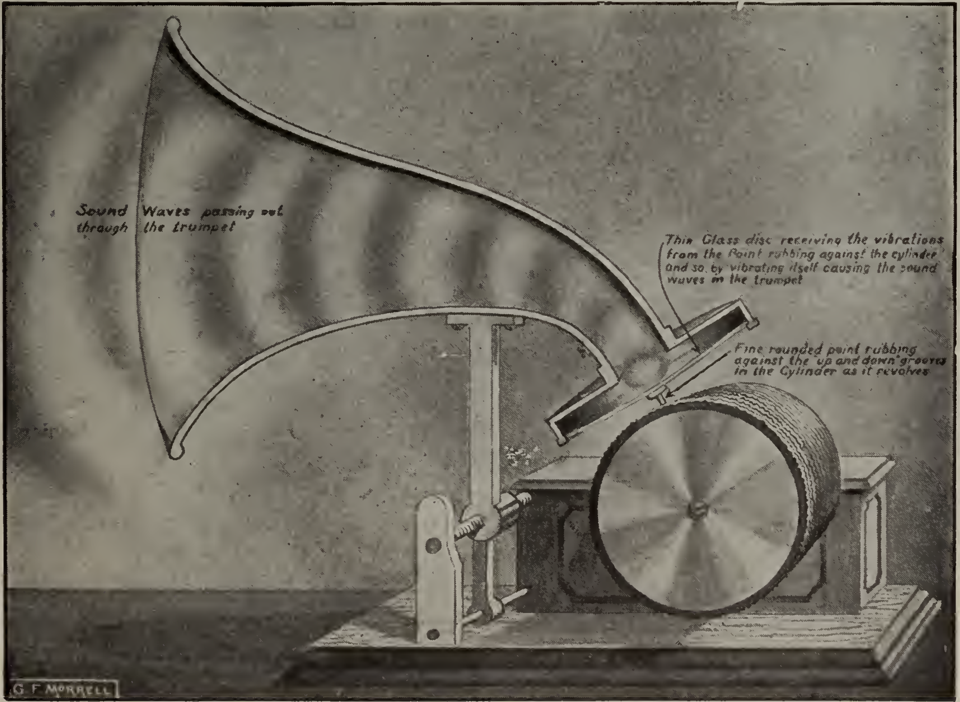

Sapphire Point of Phonograph
Steel Needle-point of Gramophone

These two pictures show the making of gramophone and phonograph records. The gramophone record is made by speaking or singing into the trumpet, the waves of air made by the voice vibrating a needle, which makes deep marks on a vulcanite disc. In the phonograph, the needle digs into the wax of a cylinder, and the record is up and down, like hills and valleys, as shown on the left. But for the gramophone the record is zigzag, like a winding river, as shown on the right. These little marks are among the most wonderful things in the world, and will carry the voices of living people right down the ages so that they will be heard in a thousand years' time.

HOW THE PHONOGRAPH GETS ITS VOICE


Cornet
Trumpet of Phonograph cut in half to show Sound Waves rushing down to beat against the thin Glass disc 1/150th of an inch thick
Sound Waves being sent out by Cornet
Circular Box of Recorder cut in half
Sharp "sapphire stone" point vibrating with glass disc and cutting a fine groove into the wax and so recording the sound waves
Thin glass Disc rapidly vibrating
Wax Cylinder revolving on Pivot worked by clockwork or motor in box
Revolving Screw worked by clockwork or motor in the box, and moving the recorder and trumpet along

Here a record is being made upon the wax cylinder of a phonograph, as explained on the opposite page. We simply reverse the process of making the machine talk, using the phonograph itself for this purpose. But to make gramophone records the gramophone itself cannot be used. A specially constructed machine has to be used, causing the recording point to make a spiral course in one line from the circumference of the disc to the centre.


Sound Waves passing out through the trumpet
Thin Glass disc receiving the vibrations from the Point rubbing against the cylinder and so by vibrating itself causing the sound waves in the trumpet
Fine rounded point rubbing against the "up and down" grooves in the Cylinder as it revolves
G. F. MORRELL

In this picture we see the phonograph talking, a process exactly the reverse of that shown above. The continuous line on the record is very fine indeed, and on some records there are no fewer than 250 turns of this continuous line to a single inch. **In a ten-inch gramophone record, the groove of the record is as much as a fifth of a mile long.**

CONTINUED ON PAGE 5731

FOREIGN WORDS AND PHRASES

CONTINUED FROM 5649

In written and spoken English many words and phrases are used that are not English at all. A great number of such words and phrases are used because they express the meaning of the writer, or speaker, better than any English words or phrases that he could use. Examples of this class are *chic, de trop*, and *ad nauseam*. Others are legacies from the time when our laws were composed in Latin, such as *ad referendum*, and many Church phrases have come to us from the time when the language of the Church was Latin, like *Dei gratia*. Others, such as *et tu Brute*, were the sayings of famous men upon memorable occasions. For whatever reason they have come to be used in speaking or writing in English, they are interesting as showing how language grows, and how one language borrows words from other languages. A very great part of the recognised English language has been borrowed in this way from French and other sources, and, unless we study the subject very closely, we are apt to forget that these words originally were anything but English. We should try to understand all that we read, and the following table explains the most familiar of the foreign phrases that we come across in papers and books.

Ab ante—From before: Latin.

À bas—Down, or down with: French.

Ab initio—From the beginning; frequently written ab init.: Latin.

Ab intra—From within: Latin.

À bon marché—Cheap: French.

Absit—Let him be absent: Latin.

Ad avisandum—Literally, to be considered; used principally in Scotland to indicate that judgment in a trial is reserved: Latin.

À demi—By halves: French.

Ad finem—To the end; usually written ad fin.: Latin.

Ad hoc—For this (end): Latin.

Ad hunc locum—At this place; usually written ad h. l.: Latin.

A die—From that day: Latin.

Ad infinitum—To infinity; and so on for ever; often written ad inf.: Latin.

Ad initium—At or to the beginning; often written ad init.: Latin.

Ad interim—In the meantime; often written ad int.: Latin.

Ad libitum—At pleasure; usually written ad lib.: Latin.

Ad locum—At the place; frequently written ad loc.: Latin.

Ad manum—At hand; ready: Latin.

Ad nauseam—To the point of loathing: Latin.

Ad referendum—To be further considered: Latin.

À droite—To the right: French.

Adsum—I am here: Latin.

Ad valorem—According to value; frequently written ad val.: Latin.

Affaire d'amour—A love affair: French.

Affaire de cœur—An affair of the heart: French.

Affaire d'honneur—An affair of honour; frequently used of a duel: French.

À gauche—To the left: French.

Aîné, aînée—Senior: French.

À la carte—According to the bill of fare: French.

À la mode—In the fashion: French.

À la mort—To the death: French.

À l'anglaise—In English style: French.

Al fresco—In the open air: Italian.

Alma mater—Literally, kind mother; applied to the university that a student has attended: Latin.

À l'outrance—A frequently-made error for à outrance : French.
Alter ego—Literally, other self ; used sometimes for a bosom friend and sometimes for someone else with a close resemblance : Latin.
Alter idem—Another of the same : Latin.
Altesse—Highness : French.
A majori ad minus—From the greater to the less ; sometimes the last two words are omitted : Latin.
À merveille—Wonderfully : French.
A minori ad majus—From the less to the greater ; the last two words are frequently omitted : Latin.
À mon avis—In my opinion : French.
Amor vincit omnia — Love conquers all things : Latin.
Amour propre—Self-esteem : French.
Ancien régime—The old order of things : French.
Anno domini—In the year of our Lord ; usually written A.D. : Latin.
Anno mundi—In the year of the world ; usually written A.M. : Latin.
Annus mirabilis—Year of wonders : Latin.
Ante bellum—Before the war : Latin.
Ante Christum — Before Christ ; frequently written A.C., but B.C. is more common : Latin.
Ante meridiem—Before noon : Latin.
À outrance—To the bitter end : French.
Apologia—Apology : Greek.
A posteriori—From effect to cause : Latin.
Appartement—A suite of rooms ; a flat : French
A priori—From cause to effect : Latin.
Aqua fortis—Strong water ; the name given to nitric acid, which dissolves nearly all metals except gold and a few other precious metals : Latin.
Aqua regia—Literally, royal water, applied to a mixture of nitric and hydrochloric acids, which dissolve gold when mixed, but do not do so singly : Latin.
Aqua vitæ—Water of life: Latin
Ars longa, vita brevis—Art is long, life is short : Latin.
À toute force—By all means : French.
À tout prix—At any price : French.
À travers—Across : French.
Au contraire—On the contrary : French.
Au courant—Fully informed : French.
Au fait—Well acquainted : French.
Au fond—To the bottom : French.
Auf Wiedersehen — Till we meet again : German.
Au plaisir de vous revoir—Till I have the pleasure of seeing you again : French.
Au revoir—Until we meet again : French.
Autres temps, autres mœurs—Other times, other manners: French.
Aux armes—To arms : French.
Avant-coureur — Forerunner : French.
Ave, Cæsar, morituri te salutant—Hail, Cæsar, those about to die salute thee ; the greeting of the gladiators : Latin.
Ballon d'essai—A trial balloon ; a "feeler" : French.
Belles-lettres—Literally, fine letters ; elegant literature, poetry, fiction, and criticism : French.
Belle vue—Fine view or prospect : French.
Bête noir—Black beast ; pet aversion : French.
Bien—Well : French.
Bien-aimé—Well - beloved : French.
Bis—Twice ; again : French.
Bona fide—In good faith: Latin.
Bona fides—Good faith : Latin.
Bonhomie — Good nature : French.
Bon jour—Good morning : French.
Bon marché—Cheap, a good bargain : French.
Bonne foi — Good faith : French.
Bon soir — Good evening : French.
Bon ton—The height of fashion : French.
Bon vivant—Good liver ; jolly fellow : French.
Bon voyage — A pleasant journey : French.
Bourse — Stock Exchange : French.
Café au lait—Coffee with milk: French.
Café noir—Black coffee ; coffee without milk : French.
Cap-à-pie—From head to foot : Old French.
Carte blanche—Literally, a white card ; full powers to act : French.
Casus belli—Reason for war : Latin.
Cause célèbre — Famous trial : French.
Cave canem—Beware of the dog : Latin.
Centum—A hundred ; generally written cent. : Latin.
C'est-à-dire—That is to say : French.
C'est magnifique, mais ce n'est pas la guerre—It is magnificent, but it is not war ; the historic saying of a French General who witnessed the charge at Balaclava : French.
Chemin de fer—Railway : French.
Cherchez la femme—Look for the woman ; there is a woman at the bottom of it : French.
Chic—Stylish : French.
Cogito, ergo sum—I think, therefore I am ; the famous proposition of the French philosopher Descartes : Latin.
Coiffeur—Hairdresser: French.
Comme il faut—As it ought to be ; gentlemanly or ladylike : French.
Compos mentis—Of sound mind ; sane : Latin.
Concours — Competition : French.
Contretemps—An inopportune happening ; a hitch : French.
Corps diplomatique—Diplomatic body : French.
Coup d'état—An unexpected stroke of policy : French.
Coup de grâce — Finishing stroke : French.
Crême de la crême—Cream of the cream : French.
Cul-de-sac—Literally, bottom of the sack ; a street open only at one end : French.
Cum grano salis—With a grain of salt ; with some allowance for exaggeration : Latin.
De die in diem—From day to day : Latin.
De facto—From the fact ; actual : Latin.
Dei gratia—By the grace of God ; frequently written D.G. : Latin.
Déjeuner—Lunch : French.
De novo—Anew : Latin.
Deo gratias—Thanks to God : Latin.
De profundis—Out of the depths : Latin.
De rigueur — Indispensable : French.
De trop—Too much or too many ; intrusive : French.
Deus ex machina—Literally, a god from the machine ; an apparent forced method or device in a plot : Latin.

Deus vult—God wills it; the battle-cry of the Crusaders: Latin.

Dies irae—The day of wrath; the Judgment Day: Latin.

Dieu défend le droit—God defends the right: French.

Dieu et mon droit—God and my right; the motto on the Royal arms of the British Sovereign: French.

Dit—Called, said: French.

Dolce far niente—Sweet do-nothing: Italian.

Domine, dirige nos—Lord, guide us; the motto of London: Latin.

Donnerwetter — Thunderstorms; used as an ejaculation, as, for instance, "Great Scott," in English: German.

Double entente — Double meaning: French.

Dramatis personæ — Characters in a play: Latin.

Dulce "domum" — Sweet "homewards"; from a Winchester school song: Latin.

Dum spiro, spero—While I breathe, I hope: Latin.

Eau sucrée—Sugared water: French.

Ecce homo—Behold the man! The expression used by Pilate when Christ appeared before the mob; also the title of a book by Sir J. R. Seeley, and of famous paintings by Correggio and by Guido Reni: Latin.

Edition de luxe—A luxurious and expensive edition of a book: French.

Eisen und Blut—Bismarck's famous phrase, meaning iron and blood: German.

El dorado—Golden land: Spanish.

Embonpoint—Stout or stoutness; literally, in good form: French.

Emeritus—Retired; generally applied to a professor: Latin.

En attendant—In the meantime: French.

En avant—Forward: French.

En déshabillé—In undress: French.

En évidence—Conspicuous: French.

En famille—In the family circle: French.

Enfant terrible—Literally, terrible child; used of a child who says indiscreet things that annoy or confuse his elders: French.

En fête—On holiday: French.

En masse—In a body: French.

En passant—In passing: French.

En route—On the road: French.

En suite—In succession; frequently misused by being made to mean "to match": French.

Entente cordiale—Good international understanding; particularly applied to British and French national friendship: French.

Entourage — Surroundings; followers: French.

En tout cas—In any case: also a sun-shade: French.

Entre nous—Between ourselves: French.

Entrez—Come in: French.

Errare est humanum—To err is human: Latin.

Et alia—And other things; generally written et al.: Latin.

Et alii—And other persons; generally written et al.: Latin.

Et cetera—And so on; and other things; usually written etc.: Latin.

Et tu, Brute—And you, Brutus; Cæsar's exclamation when he saw his friend Brutus among his assassins: Latin

Eureka—I have found it; discovered at last: Greek.

Ewigkeit—Eternity: German.

Ex cathedra—Literally, from the chair; judicially or officially: Latin.

Excelsior—Higher: Latin.

Exempli gratia—For example; frequently written e.g.: Latin

Exeunt omnes—All go out: Latin.

Ex libris—From the books; usually followed by the name of a person in the possessive case: Latin.

Ex nihilo nihil fit—From nothing comes nothing: Latin.

Ex officio—Officially: Latin.

Ex parte—On one side; biassed: Latin.

Extra muros—Beyond the walls: Latin.

Facile princeps—Easily first: Latin.

Facta non verba—Deeds, not words: Latin.

Factum est—It is done: Latin.

Fait accompli—An accomplished fact: French.

Far niente—Doing nothing: Italian.

Faux pas—A false step or mistake: French.

Felo de se—Suicide: Latin.

Femme de chambre—Lady's maid: French.

Fidei defensor—Defender of the Faith: Latin.

Foie gras — Fat liver; fat goose livers are made into paté de foie gras: French.

Fortiter, fideliter, feliciter—Firmly, faithfully, felicitously: Latin.

Fortiter in re, suaviter in modo—Forcibly in deed, gently in manner: Latin.

Fra—Brother; the title of a friar: Italian.

Front à front—Face to face: French.

Gamin—Street urchin; ragamuffin: French.

Garçon—Boy; waiter: French.

Gardez—Take care: French.

Gloria in excelsis—Glory to God in the highest: Latin.

Gloria Patri—Glory be to the Father: Latin.

Grâce à Dieu—Thanks to God: French.

Hic est—This is; generally written h.e.: Latin.

Hic et ubique—Here and everywhere: Latin.

Hic jacet—Here lies; frequently written H.J.: Latin.

Hic requiescat in pace—Here rests in peace; frequently written H.R.I.P.: Latin.

Hier spricht man Deutsch—German spoken here: German.

Hoc anno—In this year: Latin.

Hoc est—That is; generally written h.e.: Latin.

Hoch—Your health, in proposing a toast: German.

Hominis est errare—To err is the lot of man: Latin.

Homme d'affaires—Man of business: French.

Homme de lettres—Man of letters: French.

Homme d'esprit—Man of wit: French.

Homme du monde—Man of fashion: French.

Honi soit qui mal y pense—Shame be to him who thinks ill of it—the motto of the Order of the Garter: French.

Horribile dictu—Horrible to relate: Latin.

Hors de combat—Out of the fight; disabled: French.

Hôtel de ville—Town or city hall: French.

Hôtel Dieu—God's house; hospital: French.

Humanum est errare—To err is human: Latin.

Ibidem—In the same place, or in the same case: Latin.

Ich dien—I serve; the motto of the Prince of Wales: German.

Ici on parle français—French spoken here: French.

Idem—The same: Latin.

Idem quod—The same as; frequently written i.q.: Latin.

Id est—That is; generally written i.e.: Latin.

Impasse—An insuperable obstacle; a sticking point: French.
Impedimenta—Luggage; army baggage: Latin.
Imperium in imperio—A state within a state: Latin.
In articulo mortis—At the point of death: Latin.
In camera—In private: Latin.
Incognito—Privately; under an assumed name; generally written incog.: Italian.
In Dei nomine—In the name of God; frequently written I.D.N.: Latin.
Index expurgatorius—List of forbidden books: Latin.
In Domino—In the Lord: Latin.
In extremis—At the point of death: Latin.
In forma pauperis—As a pauper: Latin.
Infra—Below; often written inf.: Latin.
In loco parentis—In the place of a parent: Latin.
In memoriam—In memory: Latin.
In pace—In peace: Latin.
In posse—Within the range of possibility: Latin.
In propria persona—In person: Latin.
In re—In the matter of; concerning: Latin.
In situ—In its original place: Latin.
In statu quo—In the former state: Latin.
Inter alia—Among other things: Latin.
Inter alios—Among other persons: Latin.
Inter nos—Between ourselves: Latin.
Inter se—Among themselves: Latin.
In toto—Entirely: Latin.
Ipse dixit—His mere statement; literally, he himself said it: Latin.
Ipsissima verba—The very words: Latin.
Ipso facto—Virtually: Latin.
Jeu de mots—A pun; literally, a play on words: French.
Jeu d'esprit—A witticism: French.
Labore et honore—By labour and honour: Latin.
Lapsus linguæ—Slip of the tongue: Latin.
Lares et penates—Household gods; used of household effects, such as furniture: Latin.
Laus Deo—Praise to God: Latin.
Le beau monde—The world of fashion: French.
Le grand monarque—The great monarch, Louis XIV.: French.
Le roi le veult—The king wills it; the words in which the King of Great Britain gives his assent to a Law passed by Parliament: Norman French.
Lèse majesté—Literally, injured majesty; an offence of disrespect constituting a mild form of treason: French.
L'état, c'est moi—I am the state; a saying of Louis XIV.: French.
Liberté, égalité, fraternité—Liberty, equality, fraternity; the motto of the French Republic: French.
Locum tenens — Literally, holding the place; a temporary substitute: Latin.
Locus standi—Standing place; right to interfere: Latin.
Loquitur—Speaks; frequently written loq.: Latin.
Ma chère—My dear: French.
Ma foi—My faith: French.
Magnum bonum—A great good: Latin.
Magnum opus—A great work: Latin.
Mal à propos—Unsuitable; out of place: French.
Mal de mer—Sea-sickness: French.
Mandamus — Literally, we command; used to indicate an order made by a higher court to a lower: Latin.
Materfamilias—The mother of a family: Latin.
Materia medica—The science that studies the remedies used in medicine: Latin.
Memorabilia—Things to be remembered: Latin.
Mens sana in corpore sano—A sound mind in a sound body: Latin.
Mésalliance — A marriage between two people of different social positions: French.
Meum et tuum—Mine and thine: Latin.
Mirabile dictu—Wonderful to tell: Latin.
Mirabilia—Wonderful things: Latin.
Mise en scène—Stage get-up: French.
Modus—Manner: Latin.
Modus operandi—Mode of operation: Latin.
Modus vivendi—Literally, a way of living; a settlement or compromise between opposite parties in a dispute: Latin.
Mon ami—My friend: French.
Mon cher—My dear: French.
Multum in parvo—Much in little: Latin.
Née—Born; the expression "Mrs. Smith née Jones" indicates that Jones was Mrs. Smith's name before marriage: French.
Nemine contradicente—With no one opposing; often written nem. con.: Latin.
Ne plus ultra—Nothing further: Latin.
Nil desperandum—Never despair: Latin.
Noblesse oblige—Rank has obligations: French.
Nolens volens—Willing or unwilling: Latin.
Nom de guerre—Literally, war name; assumed name: French.
Nom de plume—Literally, pen name; name assumed by a writer. The words are French, but the expression is not good French idiom: French.
Non compos mentis—Not of sound mind: Latin.
Non sequitur—A wrong conclusion: Latin.
Nota bene—Note well; usually written N.B.: Latin.
Notre Dame—Our Lady; the Virgin Mary: French.
Nouveaux riches—Newly rich; upstarts: French.
Nulli secundus—Second to none: Latin.
Obiit—He, or she, died: Latin.
Obiter—By the way: Latin.
Obiter dictum—A cursory remark (plural, *dicta*): Latin.
Octroi—Duties collected at the gates of a city or town: French.
Œil de bœuf—A bull's-eye; a small circular window: French.
Œuvres—Works: French.
Omnia vincit amor—Love conquers all: Latin.
On dit—They say; a flying rumour: French.
Ora et labora—Pray and work: Latin.
Ora pro nobis—Pray for us: Latin.
O tempora! O mores—Literally, Oh, times! Oh, manners! What sad times! What awful doings: Latin.
Pace tua—By your leave: Latin.
Par excellence—By excellence; superb: French.
Par exemple—For example: French.
Pari passu—Literally, with equal pace; together: Latin.
Parvenu—Literally, arrived; an upstart: French.

Paterfamilias—Father of a family : Latin.
Pater patriæ—Father of his country : Latin.
Per annum—By the year ; frequently written per an. : Latin.
Per centum—By the hundred ; also written per cent., p.c., or % : Latin.
Pièce de résistance—Literally, piece of or for resistance ; the chief course at a dinner : French.
Pied - à - terre — Temporary lodging : French.
Pinxit—Painted : Latin.
Pis aller—Literally, worst go ; a makeshift : French.
Pleno jure—With full powers : Latin.
Pons asinorum—Literally, the bridge of asses ; usually applied to Euclid I. v. : Latin.
Poste restante—A department in a post-office where letters lie till called for by the person to whom they are addressed : French.
Post mortem—After death : Latin.
Post obitum—After death : Latin.
Postscriptum—Written after ; generally written P.S. : Latin.
Pot pourri—A mixture of dried flowers : French.
Pour prendre congé or p.p.c.—To take leave : French.
Presto—Quick : Italian.
Prima facie—On the first view : Latin.
Primo—In the first place : Latin.
Pro and con—For and against: Latin.
Pro forma—As a matter of form : Latin.
Pro patria—For our country : Latin.
Pro rata—In proportion : Latin.
Prosit—Your health, in drinking a toast : German.
Pro tempore—For the time ; frequently written pro tem. : Latin.
Proximo — Next ; generally written prox. : Latin.
Quid pro quo—Literally, what for what ; value for value, or value in return : Latin.
Qui s'excuse, s'accuse—He who excuses himself accuses himself : French.
Quod erat demonstrandum—Which was to be proved : Latin.
Quod erat faciendum—Which was to be done : Latin.
Quod vide—Which see ; generally written q.v. : Latin.
Quo vadis—Whither goest thou : Latin.
Raison d'être—Reason for being : French.
Rara avis—A rare bird ; a curiosity : Latin.
Reductio ad absurdum—Proof by proving the ridiculousness of the contrary : Latin.
Répondez, s'il vous plaît—Reply, if you please : French.
Requiescat in pace—May he rest in peace : Latin.
Ruse de guerre—Stratagem : French.
Rus in urbe—Country in the city : Latin.
Sancta simplicitas—Child-like simplicity : Latin.
Sanctum sanctorum — Holy, of holies : Latin.
Sang froid—Literally, cold blood ; indifference : French.
Sans cérémonie — Without ceremony ; informal : French.
Sans culottes—Breechless ; a name given to some agitators at the beginning of the French Revolution : French.
Sans peur et sans reproche—Without fear and without reproach ; the phrase used to describe the Chevalier Bayard (about whom we have read) : French.
Sartor resartus—The tailor reclothed ; the name of a book by Carlyle : Latin.
Savoir-faire—Tact : French.
Semper eadem, or semper idem —Always the same : Latin.
Sequentes, or sequentia—The following ; generally written seq. : Latin.
Seriatim—One after another : Latin.
Sic transit gloria mundi—Thus passes worldly glory : Latin.
Sine die—Without day ; indefinitely ; frequently written s.d. : Latin.
Sine qua non—Without which not ; an essential : Latin.
Soi-disant—Self-styled ; pretended : French.
Status quo, or status quo ante—The existing or former condition : Latin.
Sturm und Drang—Storm and stress : German.
Suaviter in modo, fortiter in re—Gentle in manner, strong in action : Latin.
Sub judice — Under consideration, or in course of trial : Latin.
Sub pœna—Under a penalty : Latin.
Sub rosa—Under the rose ; privately : Latin.
Sub voce—Under the word ; as, for example, under the word in a dictionary or encyclopædia : Latin.
Sui generis—Of its own species ; peculiar : Latin.
Summum bonum — The highest good : Latin.
Supra—Above : Latin.
Tableau vivant—Living picture : French.
Tempus fugit—Time flies : Latin.
Terra incognita—An unknown country : Latin.
Tête-à-tête—Literally, head to head ; a private conversation between two : French.
Tour de force—A feat : French.
Tu quoque, Brute—And thou, too, Brutus ; the same as et tu, Brute : Latin.
Ultima thule—The farthest boundary : Latin.
Ultimo—Last ; usually written ult. : Latin.
Ultra vires—Beyond one's power : Latin.
Vade mecum—Go with me ; a constant companion : Latin.
Veni, vidi, vici—I came, I saw, I conquered ; Cæsar's famous saying : Latin.
Verbum sapienti sat est—A word to the wise man is sufficient ; often contracted to verb sap : Latin.
Versus — Against ; often written v. : Latin.
Via—By way of : Latin.
Via media—A middle course : Latin.
Vice—In place of : Latin.
Vice versa — Transposed : Latin.
Videlicet—Namely ; usually written viz. : Latin.
Virginibus puerisque — For girls and boys ; the name of one of Stevenson's books: Latin.
Vis-à-vis — Face to face : French.
Vita brevis, ars longa—Life is short, art is long : Latin.
Viva voce—By oral testimony : Latin.
Vive la république—Long live the republic : French.
Vive l'empereur—Long live the emperor : French.
Voilà—There is : French.
Volente Deo—God willing : Latin.
Volo, non valeo—I am willing, but unable : Latin.
Vox populi, vox Dei—The voice of the people is the voice of God : Latin.

THE CHILD'S BOOK OF SCHOOL LESSONS IS NOW ENDED

CLEOPATRA OF THE NILE

THE LAST QUEEN OF EGYPT

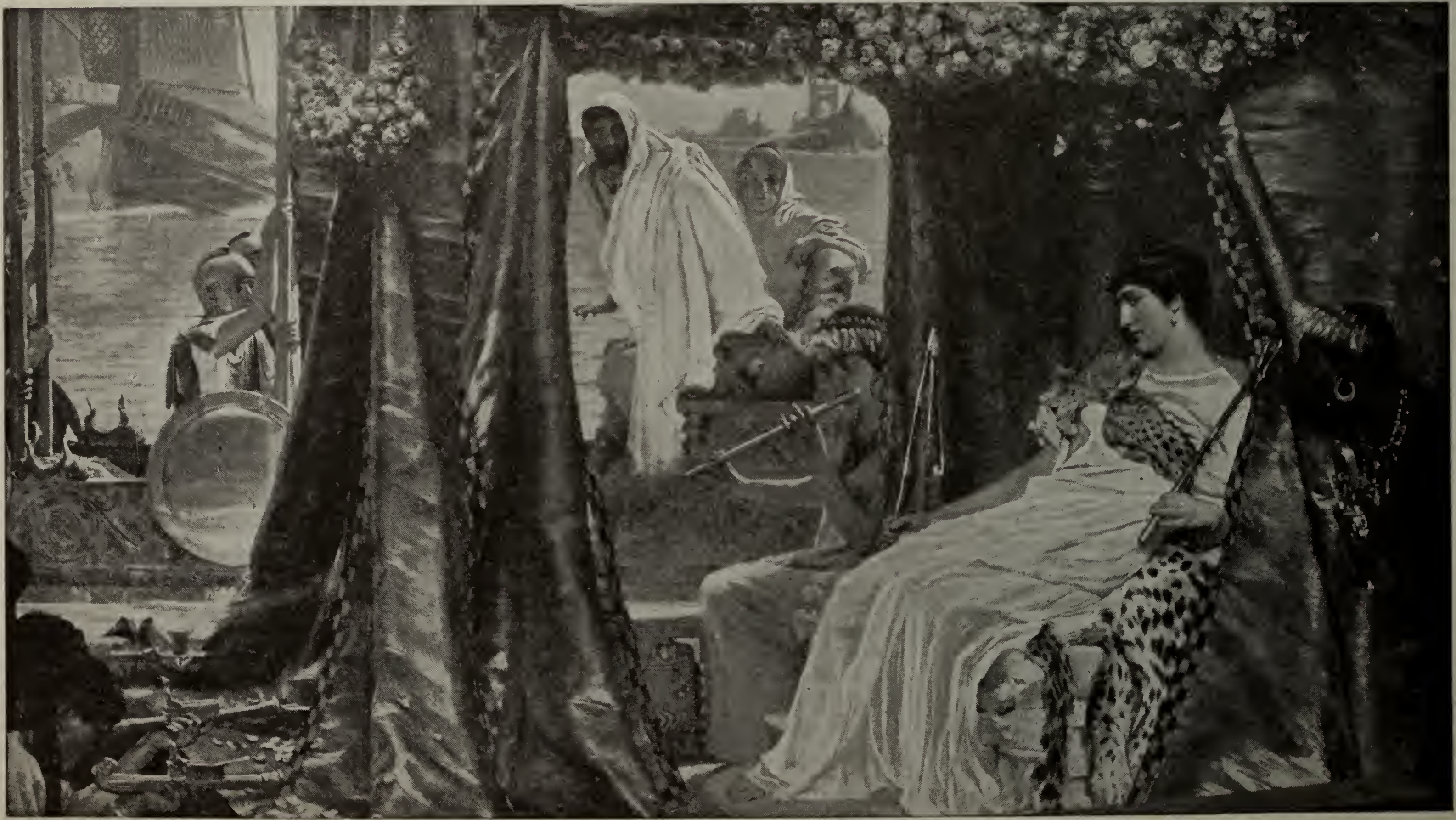
CONTINUED FROM PAGE 5584.

THE wit and beauty of a woman may be dangerous unless the woman has goodness also. In ancient times there were many beautiful and brilliant women, but these women helped, very often, only to make men worse, instead of making them better and nobler. Their wickedness was not regarded as misdoing. It was considered no worse for the famous women of the ancient world to live bad, selfish lives than it was, ages and ages later, for Queen Elizabeth to bless the ships which were going to capture men, women, and children to sell as slaves. There was less excuse for Queen Elizabeth than there was for the women of olden times. Let us, in charity, remember this now that we come to the amazing story of Cleopatra.

Cleopatra was born heiress to the throne of Egypt; the day came when she helped to rule half of the world. She was the last daughter of the house of Ptolemy. The Ptolemies were kings of Egypt for three hundred years, and she was born to rule over the land which Moses ruled for Pharaoh. Her birth occurred sixty-nine years before the birth of Christ, and the king, her father, loved her. The young princess grew up lovely beyond comparison, and learned beyond, perhaps, all other women of her age. She was a Greek in blood, she was Greek in beauty, she was Greek in learning, but her natural talent was a blend of the wise old East of which she was a daughter, of refined Greece, and of the more modern culture of Rome, which then ruled nearly all the known world.

All that the scholarship of the greatest professors could teach her, Cleopatra learned, but no teaching can give wit. Wit was born in her, wit and natural grace and all that charm which cannot be described, but which we find in a gifted woman. She grew up in the greatest centre of learning in the world. Her home was Alexandria, the capital of Egypt. The city had been founded by Alexander the Great, and called after his name. In Cleopatra's day it was a city of libraries and schools, museums and palaces of art. To Alexandria flocked learned men from all parts of the earth. In art and philosophy and science Alexandria stood alone in the world; there was no place to compare with it. Its doctors

MARK ANTONY APPROACHES CLEOPATRA SEATED IN HER GALLEY



AT THE FIRST SIGHT OF THE EGYPTIAN QUEEN, MARK ANTONY WAS FASCINATED BY HER BEAUTY, AND FOR HER HE GAVE UP THE EMPIRE OF THE WORLD

This picture is from the painting by Sir Lawrence Alma-Tadema, R. A., and is reproduced by permission of the Berlin Photographic Company.

were the greatest that the world had seen. When Alexandria's greatness fell, half the knowledge of the world was blotted out. It took us two thousand years to relearn many of the great secrets which the learned surgeons and doctors of Alexandria had mastered. The library of Alexandria was the most famous in the world, and when it was burned the intellectual life of the world suffered a loss which has never been repaired. The court of the king was the seat of splendour and magnificence. His ships covered the Mediterranean; his caravans were scattered over all the ways of the desert. This, then, was the scene in the centre of which the beautiful young princess grew up.

She was first known to the world when she was fourteen. She was even then famous for her learning. She could speak, so we are told, seven or eight languages, she was very musical, she knew history, and thoroughly understood politics and philosophy and art; she was quite a wonderful girl. When she was seventeen her father died. He left the throne equally to herself and her brother Ptolemy. She showed herself active in government, and was much too strong a character for the small mind of her brother. He may have been much better as a man than she was as a woman, but, whatever the cause of difference, he declined to share the throne with her, though their father had left it to them both. Possibly his advisers were more responsible than he; they did not like the daring spirit in which she sought to conduct the government of the country. Be that as it may, Cleopatra found it necessary to retire into Syria. But her proud spirit would not accept defeat like this; she at once made preparations to regain her lost kingdom by force of arms.

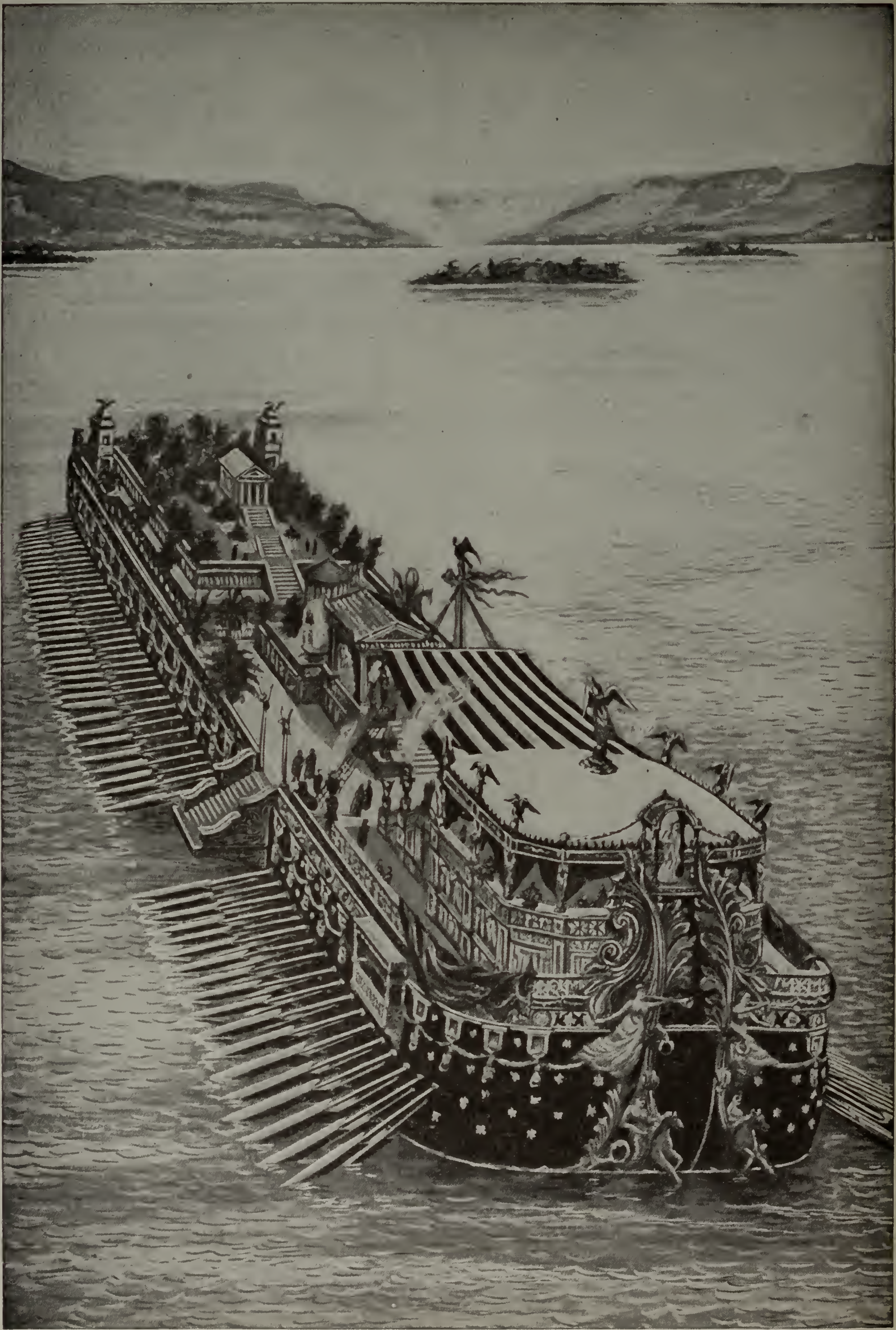
Rome was mistress of the world, but Egypt was still an independent kingdom. When this quarrel between Cleopatra and her brother Ptolemy arose, there was a similar struggle going on in Rome for mastery. Julius Cæsar had been for ten years out of Rome. He had conquered Gaul and invaded Britain. By his conquest of Gaul he had paved the way for the civilisation of the world to the west. Other great Romans had been content to take their armies eastward, where easy conquests were to be won. While Cæsar was away, Pompey, who in name was the real ruler, gradually gave himself and the empire over to corrupt and bad men, and the power of Cæsar, whose conquests had won him great popularity and fame, was in danger. So he marched into Rome with a small army, was joined by great forces, and defeated Pompey.

Pompey fled to Egypt, and there Cæsar followed him, to find the kingdom divided in the way we have seen. He determined to put an end to the struggle one way or another, lest war and unrest should spread into Roman dominions. Cleopatra determined to win him to her side. She was afraid to go openly to Cæsar's palace, so she had herself concealed in a roll of carpet. This was carried into the presence of Cæsar, and out she sprang. Such a vision of loveliness Cæsar had never before beheld — Cleopatra at nineteen, beautiful beyond words, gifted with all the arts and accomplishments that make a woman powerful. Cæsar's heart went out to the beautiful young queen, and he decided not only that the possession of the Egyptian throne should be settled, but that it should be settled in her favour. As Ptolemy and his advisers still refused to restore her to the throne, Cæsar made war upon them, and in the battle Ptolemy was killed.

But the man who had restored her to her throne loved her, and she loved him; and when he returned to Rome she soon afterwards followed him. Her presence in Rome as the lover of Cæsar created much scandal, even in that wicked city; but she stayed in defiance of it, fearing nothing so long as Cæsar, now the ruler of the world, was on her side. But, as we all know, Cæsar was murdered, and Cleopatra, lacking a protector, returned at once to her own country.

When Cæsar died, the power of the empire was divided between three men.

THE FLOATING PALACE OF AN EMPEROR



This picture of a wonderful floating palace that was built by the Roman Emperor Caligula gives some idea of the magnificence of Cleopatra's galley, for Caligula's remarkable vessel, the remains of which lie under the waters of Lake Nemi, in Italy, was probably made after the model of a famous galley belonging to one of Cleopatra's forefathers.

CLEOPATRA IN ALL HER SPLENDOUR

PRISONERS OF WAR BEING BROUGHT BEFORE CLEOPATRA, WHO IS SEATED IN HER CHARIOT

One was Caius Octavius, who was afterwards the Emperor Augustus; the second was Lepidus, who in five years was pushed out of the way; the third was Mark Antony, who, while Cleopatra was in Rome, had admired her beauty and charm. Octavius was the grandson of Cæsar's sister, and had been adopted by the latter, and though he was only twenty at Cæsar's death, he showed great talent, though not great humanity. But for this, Antony, who made the memorable speech over Cæsar's dead body of which we are told in Shakespeare, would himself have become sole ruler. But it was not to be. Just as Cæsar was to meet the lovely Queen of the Nile, so was Mark Antony. War followed Cæsar's death, and at the end of it Antony, who was in Cilicia, Asia Minor, sent for the queen, to make her account for something which she had done in the war which he regarded as unfavourable to Rome.

Instead of going as a penitent, she went in triumph. She sailed up the River Cydnus in state. It was in this river that Alexander the Great nearly lost his life. It was this voyage of Cleopatra up the Cydnus which cost Antony his power and half the world. There never was before, or since, such a procession as that of Cleopatra to see the great soldier and ruler who was to take her to task for what she was supposed to have done. She sailed like a goddess in a magnificent galley. The back part of the vessel was covered with gold, the sails were of purple, and the oars were of silver. The rowers rowed in time to the sweet strains of flutes and pipes and harps. Cleopatra lay under a canopy embroidered with gold, arrayed as a goddess; while rosy, dimpled boys gently fanned her.

When she arrived, Antony sent to invite her to supper; but she refused to go, saying that it was his duty to wait upon her, and Antony went. He was amazed at the reception she gave him, and the banquet she spread before him, the thousands of lights and splendours such as he, a man of the camp, had never before witnessed. He fell completely in love with her, as Cæsar had done, and neglected the affairs of the empire to return with her to Alexandria. In Alexandria they lived a life of the greatest luxury and extravagance, giving banquets and feasts such as even Alexandria had not previously known, but the story that Cleopatra dissolved pearls in vinegar or wine is, of course, not true.

Together they rode, and hunted, and fished, and held reviews of the troops. When Antony was gay, Cleopatra made him more gay; when he was sad, she enlivened him with jest and music. At night she would go out with him, disguised as a servant, and he would put on similar clothing. They roamed together like thoughtless children, though she was queen of the land and he was ruler of half the earth. In her presence he forgot his manhood and his great responsibilities. They were out fishing one day, and Antony was unlucky. This, he thought, must disgrace him in the eyes of Cleopatra, so he ordered one of his men to slip secretly into the water, and to put on his hook fish which had already been caught. Cleopatra discovered the trick as fish after fish was brought up. She was too clever to let him think she had noticed it, and, instead, she expressed her surprise, and called the people's attention to his skill. Next day she called the people to see a fresh display by Antony as a fisherman. The vessel was crowded when Antony sat down to fish. As soon as he let down his line, Cleopatra quietly ordered one of her divers to put a salted fish on his hook. This Antony drew up, pretending that he had caught it; but the trick was discovered, amid shouts of laughter from the people.

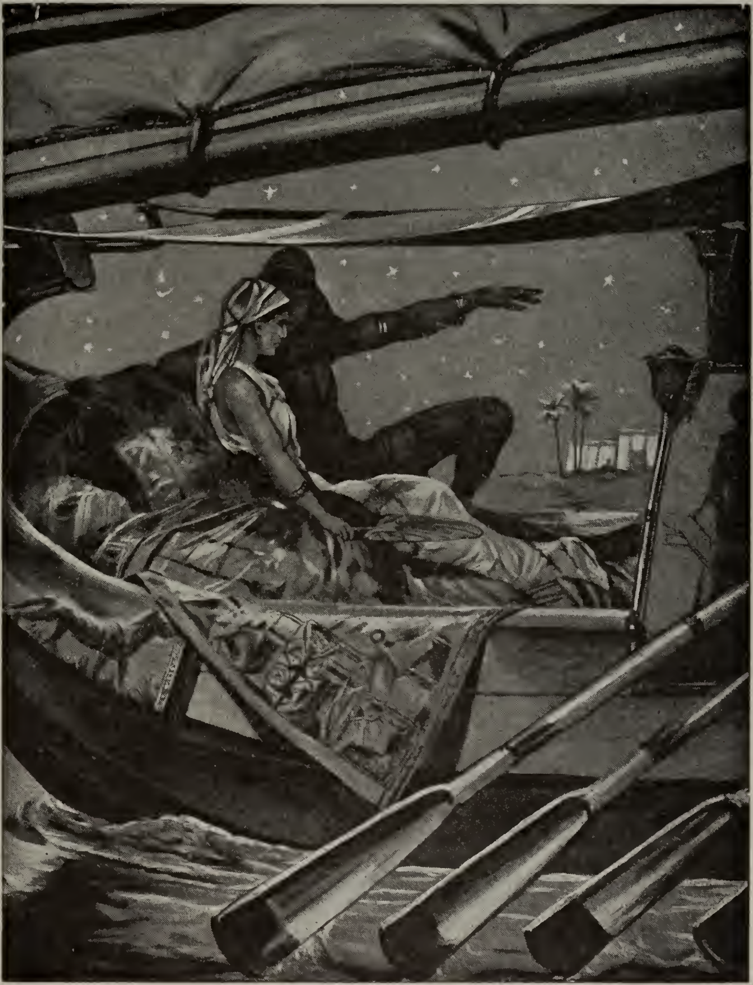
At last Antony was recalled to Rome, where his family were at war with Octavius. He remained away from Egypt for three years, and in this time he married Octavia, the sister of Octavius. She was a good and noble woman, and would have made Antony a good wife, but, at the end of three years, war called Antony to the East again. He had hardly started before his thoughts turned again to Cleopatra. He had set out to make war on the Parthians, but he gave up the war for the sake of the Egyptian beauty. She was probably glad to be able to exert her old power over him, and, by so doing, keep Egypt an independent kingdom. It needed but a word from Antony to have made it a miserable province of Rome — as, a few years later, it actually became.

He welcomed her with joy. He gave her Phœnicia, Syria, Cilicia, and a part of Judea and Arabia. But the countries were really not his to give; they belonged to the Roman nation.

The same life of extravagance and pleasure followed; there was no thought of serious duty, all attention was given to luxury and slothful ease. Antony's conduct roused the Romans, and Octavius now resolved to reign alone. This led to civil war again.

In preparation for the war, Cleopatra provided Antony with two hundred ships, and money which, in our coinage, would amount to about twenty million dollars.

Octavius advanced to meet him with a much smaller force, but his soldiers were in better training, because they had not been spoilt by luxury and laziness. Antony desired to fight on land, as he should have done, but Cleopatra, who accompanied him, persuaded him to fight at sea. This he did — at Actium, off the coast of Greece. It was one of the greatest battles of ancient times, but Antony ought to have won it. He must have won had he been fighting in a just cause. But just when the fortunes of the day were about to turn, Cleopatra suddenly sailed away with her ships for Egypt. So mad was Antony's passion for her that he, the bravest soldier of Rome, actually deserted his fleet and followed her.



CLEOPATRA ON THE NILE

Antony hoped to find other troops faithful to him, though how he could expect such a thing, considering that he had fallen through his own fault, it is hard to understand. With his fall, the fate of Cleopatra seemed sealed, but she tried to make peace with Rome. Octavius caused it to be known that the only way in which she could win his favour was by her having Antony killed. What her answer to this proposal was we do not know, but it was evident that the end was near. Antony discovered that she had betrayed him to those he had fought only for her sake.

CLEOPATRA DROPPING A PEARL INTO A GOBLET OF WINE

Cleopatra, in an agony of fear, fled to a great tomb which she had prepared for herself, and caused a report to be sent to him that she was dead. Hearing this, Antony was heartbroken. He had with him a servant named Eros, who was under promise to kill him should Antony beg him to do so. Antony now called upon Eros to perform his vow. Eros drew his sword as if to slay his master, but, turning aside, he plunged the sword into his own bosom and died.

"This was greatly done, Eros," said Antony. "Thy heart would not permit thee to kill thy master, but thou hast taught him by thy example what to do." He drew his sword and fell upon it. The blow was not at once fatal, and he begged those around to end his life. They fled from him, but a servant of Cleopatra drew near and said that she had sent for him. Hearing that Cleopatra was not dead, the spirit of the dying man revived, and he was carried, dying, to the tomb where she was hidden.

Cleopatra obtained permission to bury him with splendour. Then, hearing that Octavius meant to take her to Rome to grace his triumphal entry into the city, she begged leave to go for the last time to the tomb. Here she took a touching farewell of the dead. Then she put on her choicest raiment, and ordered supper.

When Cæsar's officers returned, they found Cleopatra lying dead on a bed of gold. One of the women was dead, and the other, who was placing the crown on her dead mistress's head, died afterwards. One story is that she died from the bite of a serpent brought in a basket of figs. Octavius buried her in the tomb with Antony, with all the pomp due to the last Queen of Egypt. She was thirty-nine when she died in 30 B. C.

CONTINUED ON PAGE 5751.

Budapest and the river Danube as seen from the royal castle.

CONTINUED FROM PAGE 5676

THE LAND OF A THOUSAND YEARS

THE BEAUTIFUL HOME OF A HUNGARIAN NATION

When the English, about the middle of the last century, were struggling for reforms and rights of all kinds, so that the British nation might be free in fact, as well as in name, they were not alone in their uprising. It was only part of a wonderful wave of feeling that was passing over the wide plains and mountain ranges of all Europe and far beyond; and nowhere was this wave of feeling more rousing, more strong, than in the central country of Hungary.

The depth of the interest felt in the struggle we know by the reception given to one of Hungary's patriots who came to England and the United States in those stormy times. Seldom have both countries been so excited over the presence of a man. His name was Louis Kossuth.

But let us consider how we are to make our journey. No doubt we all have different views as to the route by which we should like to reach Hungary. The good sailors will think it delightful if a steamer can take them for a cruise through the Straits of Gibraltar into the beautiful Mediterranean, along the fairy-like eastern shores of the Adriatic, all islands and bays and mountains, before landing at Hungary's busy port, Fiume. It is here that the land-girt country — larger than the United Kingdom — stretches down, just a finger, as it were, to touch the salt water. Just one! No wonder our Hungarian friends think much of the good fortune of those countries blessed with many good harbours. Twelve hours' railway journey by mountain and valley and along the shores of Lake Balaton, which is the largest lake of Central Europe, and is fifty miles long, connects Budapest, the capital of the country, with its port, Fiume.

More adventurous members of our party are sure to suggest travelling from Hamburg or Bremen across the great north plain of Germany by Berlin and Cracow, and dashing, as the Huns did a thousand years ago, through the passes of the Carpathians. As we look for the exact spots where the terrible horsemen swarmed through — perhaps with a thought of the landing of the first Saxons in England — we realise the grandeur of this mountain rampart, in many parts twice as high as the Bens of Scotland. Springing from the gate where the Danube — written Duna in Hungarian — enters the country on the west, it girdles round the great central plain in an immense sweep, first north, then east, and then, bending south and west, helps to form the famous Iron Gate, where the mighty river leaves the country on the east.

THE BLUE ROLLING DANUBE

We feel dazed when we think of all the beauties and wonders to be seen in those mountains, but first we would see the blue rolling Danube. Our hearts sing as we think of it. There is our route: let us take train to Vienna, thirty-six hours from London, and approach Hungary by steamer on the wide brimming river. It is but four hours by rail from the Austrian capital to that of Hungary, but we are in no hurry; we want to glide quietly into the heart and soul of the country by the magnificent waterway that leads through it, and to have time to ponder over the outline of a picture that we hope to fill with colour and life before we leave.

Our outline begins with the daring Magyars, who, under Almos and his son, Arpád, cross the Carpathians at the end of the ninth century, settle in the great central plain, and are ruled by native kings for many centuries. In the middle of the sixteenth century a member of the Hapsburg family of Austria is called to the throne, in the hope that their great power may help in defending Hungary, the bulwark of Christendom, against the terrible onslaughts of the Turks. Through the following centuries Hungary, crushed for a time under the Turks, revives and struggles with great heroism to keep its ancient independence, for the Hapsburg rulers wish to make it a part of Austria.

EQUAL STATES SIDE BY SIDE

The struggles are crowned with final success about the middle of the nineteenth century, and to-day Austria and Hungary stand firmly as equal states, side by side, the government of each being quite distinct. They have a ruler in common; their sovereign, Francis Joseph of the Hapsburg family, is King of Hungary as well as Emperor of Austria. Also they have agreed to have a common army and navy, common ambassadors to other countries; also, for the present, they have customs arrangements in common.

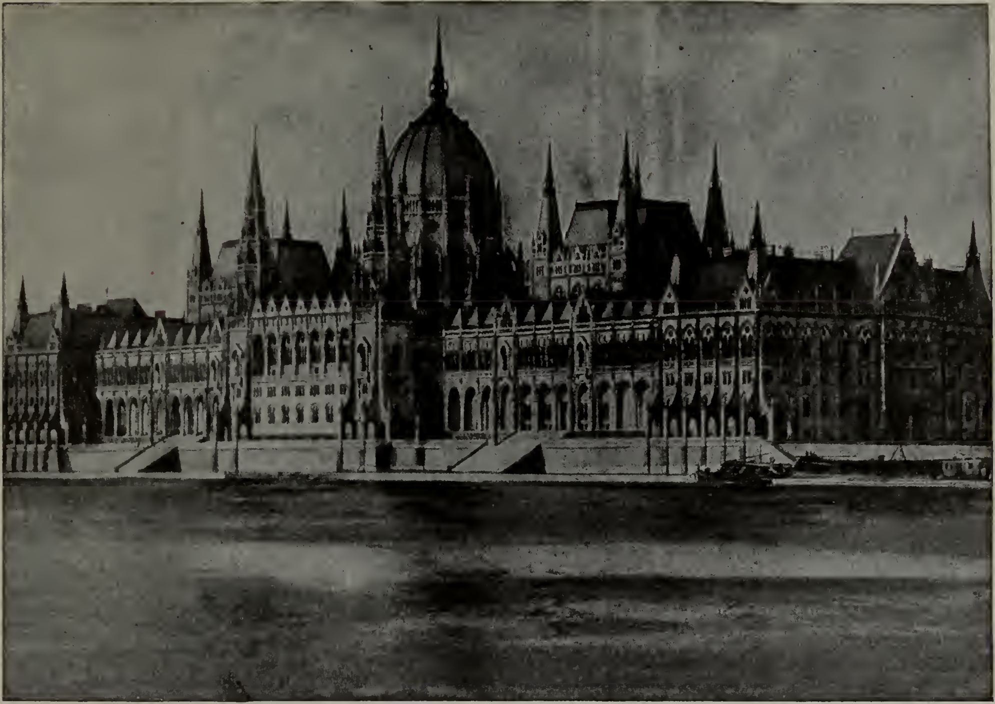
But our steamer is hurrying us on out of Austria, and we are soon at the Carpathian gate where the Alps and the Carpathians face each other. There are stories of battle in every hilltop castle, in every old town and tower that we pass, and we are soon at Pozsony, whose German name is Pressburg, an important town of Hungary. We must stop a day to see it. The old castle in which the Empress Maria Theresa of Austria, in the eighteenth century, made her striking appeal to the Hungarian nobles, with her boy in her arms, was burned down years ago. But the sounding words shouted by the brave nobles as they flashed out their swords in answer to her appeal, "Our life and our blood for our lord and king, the crown and our country!" still seem to echo round Pressburg. From the walls of the fortress we get a magnificent view, as far as Vienna, and spend some time looking over interesting churches, and the cathedral where many of the Hapsburg kings of Hungary were crowned.

We take up our journey again, and before long stop at Gran, for here is the largest cathedral in Hungary, with its priceless works of art, the seat of the Primate, or chief archbishop. St. Stephen, the first Christian king of Hungary, is said to have been born at Gran, and he was baptised and crowned here.

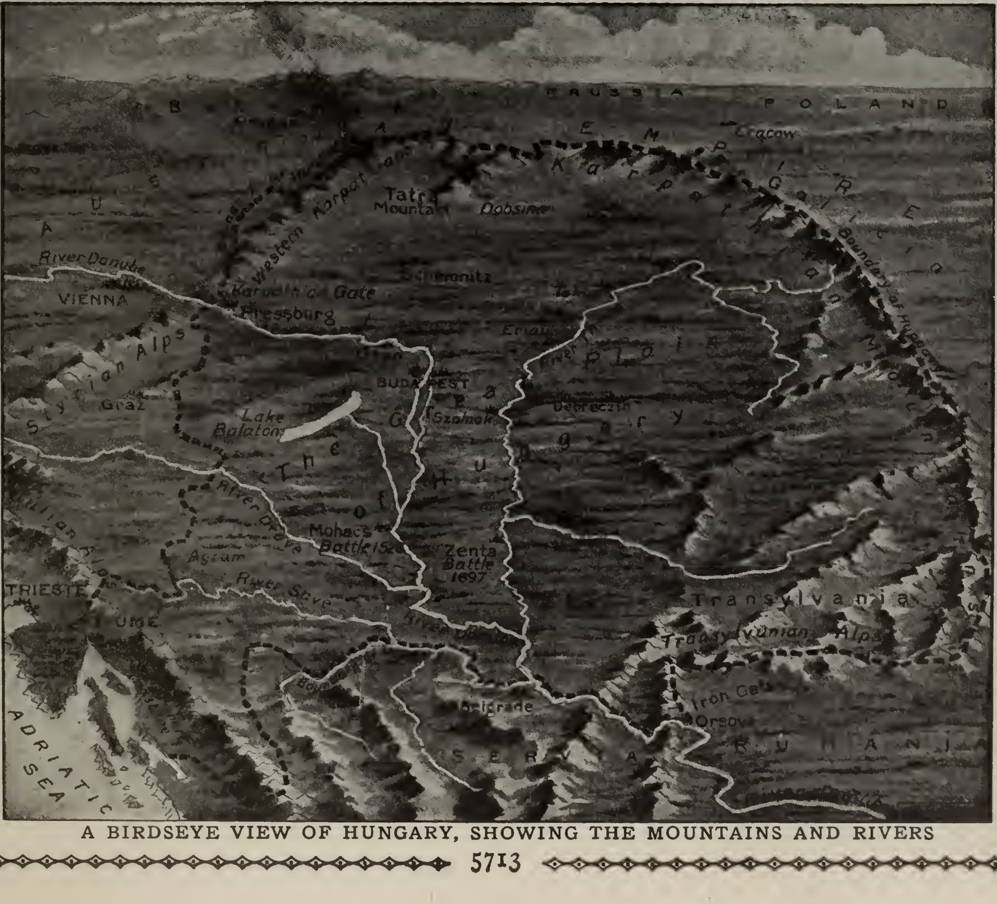
THE PEOPLE'S LOVE FOR KING STEPHEN

It is not easy for us to realise the deep love and admiration the Hungarians still have for this king of theirs who lived nearly a thousand years ago. He was the great-great-grandson of Arpád, the leader of the

HUNGARY AND ITS PARLIAMENT HOUSE



THIS WAS COMPLETED TO CELEBRATE HUNGARY'S THOUSANDTH ANNIVERSARY



A BIRDSEYE VIEW OF HUNGARY, SHOWING THE MOUNTAINS AND RIVERS

Magyars over the Carpathians into the great plain. Stephen's chief work was to make Christianity the ruling religion in the new Fatherland. He so civilised the state over which he ruled that the old roving, Eastern spirit — so strong in the forefathers, who saw no harm in robbing and raiding — was gradually subdued, and in time the Hungarians, together with other races who settled as welcome colonists within their borders, slipped into their place in the European family of nations.

A little beyond Gran, the Danube turns abruptly southward, and we come to the heart and capital of the kingdom, Budapest. We enter it in the dusk of evening. From afar we have seen the golden haze of the thousands of lights in the clear air, and as we draw near they glint and glimmer of the dark water from the embankments and bridges, and we cry out in delight, "We have sailed into fairyland indeed." But no; solidly against the darkening sky stand out the hills and the noble buildings that we look forward so much to seeing. What a situation we discover in the morning light! For several miles on both banks of the river, connected by many magnificent bridges, stand houses and churches and great public buildings. What can we see first?

Let us mount the steps up the hill of St. Gellert, the last spur of the Alps, and stand beside the impressive figure of the missionary holding the cross aloft. St. Gellert was killed soon after St. Stephen's death in the final struggle of the Hungarians with heathenism.

A KING'S HAND AND A BURIED CROWN

What a view! The rolling Danube is in the midst of the picture, bearing many steamers and yachts, and little boats and barges and rafts on its sunny bosom, and the homes of thousands, great and small, crowd beside it, on the hilly slopes of the right bank, on the flat borders of the left. Not far away is the huge pile of the royal palace, where the king stays when he visits his capital. Very splendid are the great halls and rooms and courtyards that now cover the ground so fought for through the centuries, on the fortress-hill of Buda.

In the Chapel Royal of the palace is kept the nation's most treasured relic, the embalmed right hand of St. Stephen, which is carried round and shown to the people each year on St. Stephen's Day. Also, in a strongroom in the palace are other precious treasures — the sacred crown, the lower part of which was given to St. Stephen by Pope Sylvester II. in the year 1000, along with other emblems of royalty. They may well guard the crown carefully, it has had many adventures, and has been carried hither and thither. Louis Kossuth had it buried for safety for four years, at the extreme end of the kingdom, where the Danube leaves it, near the Iron Gate.

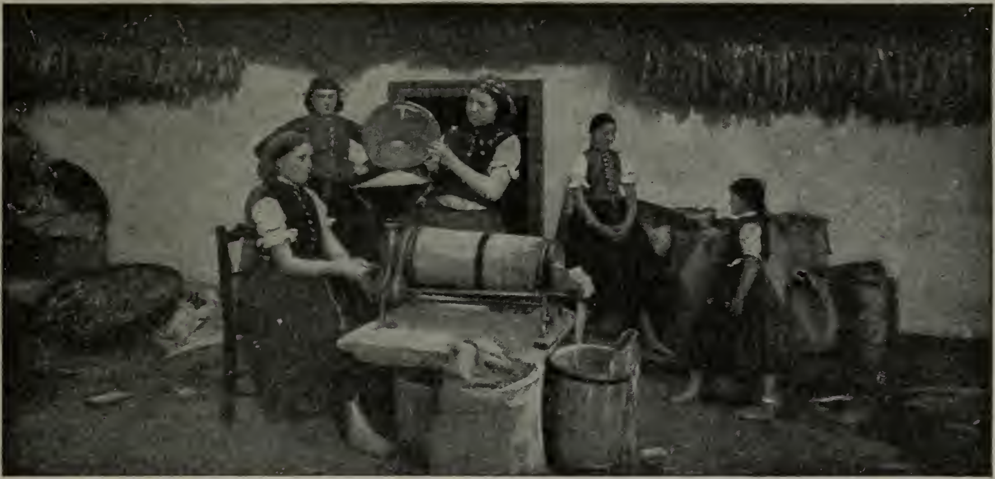
THE BITTER FIGHT FOR FREEDOM

The Parliament building, on the left bank, with its fine dome and many spires, looks most imposing from the river. Here the members elected by the people meet to make laws and arrange taxes, and discuss matters of government in much the same way as is done in our Capitol on the Potomac. The constitution of the Hungarians is many times as old as ours, and their fight to maintain it has been much more bitter, much more full of suffering, than ours.

A fine service of electric cars, or a comfortable cab with two horses, takes us about the streets, to see the beautiful Town Park and the National Museum, to the magnificent Opera House, to St. Stephen's Cathedral and the St. Matthias Coronation Church; to Margaret Island, a delightful fairyland of shady gardens, with rose hedges and a waterfall and interesting old ruins.

We feel deep interest in the monuments and statues scattered over the city, for here we are brought face to face with the noble sons of Hungary who have helped to make her great. Their names are difficult to pronounce and to remember, as, indeed, most

THE HOMES OF THE HUNGARIAN PEOPLE



HUNGARIAN WOMEN CRUSHING MAIZE IN A SIMPLE TYPE OF HAND-MILL

MAIZE HANGING FROM A COTTAGE ROOF

INSIDE A MOUNTAIN COTTAGE

PEASANTS OF SWABIA INSIDE THE PRINCIPAL LIVING-ROOM OF THEIR COTTAGE

Hungarian words are, but we are determined to master them.

STATUES OF KINGS AND HEROES

There is, first of all, the fine bronze statue of St. Stephen, holding the double cross like the one borne before the Pope, near the Coronation Church; and not far off is that of the brave John Hunyadi, the great Turk-beater, who performed miracles of daring against hopeless odds. It is a reproduction of John Hunyadi's castle that reflects so beautifully in the lake of the Town Park, and is used as a museum. Another statue is that of King Matthias, who held such a splendid court in Buda in the fifteenth century, and had such a good name for justice. "King Matthias is dead, justice has fled," they cried. How we should have liked to see his library, the Corvina, containing thousands of magnificent books, which were carried away or destroyed by the Turks! It is grievous to think of the Crescent floating above the fortress of Buda for 150 years, and the country round lying desolate and ruined. But what a healer is Time! In the National Museum can be seen several of the most valuable of the manuscripts of the Corvina, sent back by the late Sultan!

The great poets of Hungary are not forgotten by the sculptors; among them are Petőfi and Arany, pronounced Paterfee and Aurann. Petőfi it was who stirred the souls of the people in the great awakening times of last century, and he was killed fighting for freedom. It was Arany who sang so grandly the old legends of the Huns, of the Christian struggles against the Turks, and who translated Shakespeare so beautifully. We make our way out to the cemetery to lay flowers on the grave of the great leader, Louis Kossuth, who knew our grandfathers at home. Statues of him abound all over Hungary, as do those of Count Széchenyi — pronounced Saicheny — who did good to his country in countless ways.

It was Francis Deák — pronounced Dayaak—who arranged the important details which, in 1867, brought final peace between Austria and Hungary. Statues of many of the patriots whom Hungary can never forget are placed in the streets and squares. Especially we notice the "Honvéd" memorials, of which there are so many, dedicated to the brave National Guard, which did such fine service in the middle of last century when the closing scenes of the great fight for independence were being successfully played out.

THE LIFE OF THE PEOPLE

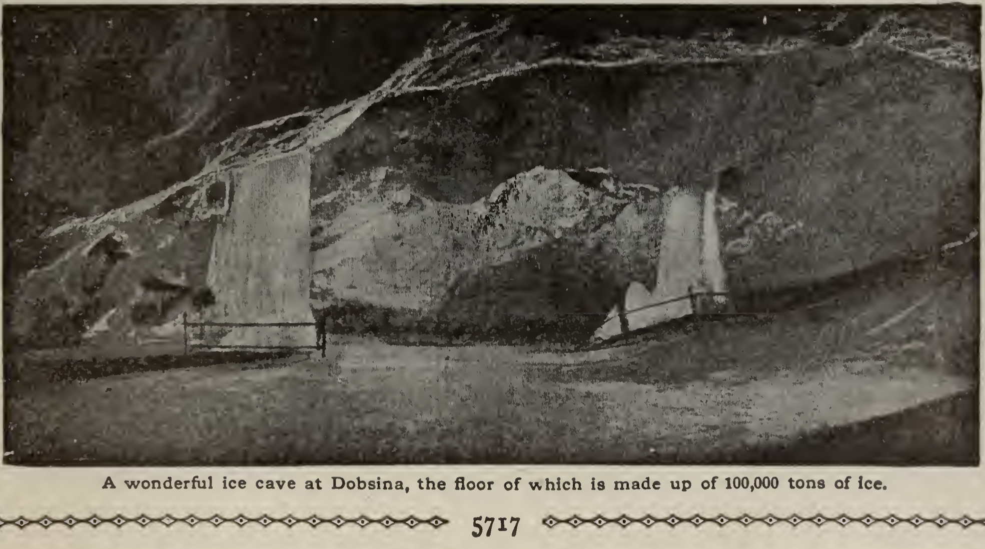
The Millennium memorials are also scattered everywhere. They bring to mind the thousandth anniversary of the existence of the Hungarian nation. A great festival was held in 1896 to celebrate not only the dash over the Carpathians a thousand years before and the fact that the sacred heritage of freedom in constitution, laws, and government had been successfully handed down through the centuries, but to celebrate also the advance in education and in reforms for the people which have followed in the wake of peace.

We are very unwilling to leave Budapest, for there is much to see, so many museums and fine excursions; but nearly all Hungary still lies before us, and a rest on our steamer will be welcome as we pass by the river into the great plain, the very soul of the country. Far away it stretches till it meets the edge of the great dome of sky on the round horizon. As we pass along southward, there are endless variety and interest in the scenes before us. The countryfolk look gay in their various costumes; the great fields of waving grain remind us that Hungarian flour is excellent; the marshy swamps and high embankments speak of the overflowing of waters, and the great skill of the Hungarians in regulating their flow. At Mohács we see women peacefully washing their clothes at the riverside, and fetching water in jars hung on a sort of yoke on their shoulders. The field of Mohács is a dread name in Hungarian ears, for it was there that the king, the nobles, and nearly all their followers,

THE MOUNTAINS AND SEAPORT OF HUNGARY

Fiume, one of the few seaports of Hungary, on the Adriatic Sea.

A Typical Hungarian village, showing the mighty Carpathian Mountains beyond.



A wonderful ice cave at Dobsina, the floor of which is made up of 100,000 tons of ice.

perished in deadly fight with the Turks, who then rushed triumphantly on over their dead bodies to Buda. About a century and a half later another battle was fought at Zenta, which put an end for ever to the hated rule of the Turks.

AT THE KEY OF THE DANUBE

We feel special interest in the junction of the canals, made to shorten the winding of the river, and to cut across the plain between the Danube and the great — wholly Hungarian — River Theiss, as long as the Rhine. The Theiss's slow waters, which drain, with many windings, the great plain and the Carpathians behind, join the Danube from the north after it has turned eastward. The Drave and the Save come from the west, bearing the waters from the cold, snowy Alps.

The Save joins the Danube at Belgrade, the capital of Servia. Greatly do we enjoy the life and bustle as we come to this important place. We see the peasants crossing from the central plain to find a market for their boatloads of fruit and vegetables, and steamers, boats, barges carry goods of all kinds on the great highway. All is peaceful and quiet now, but we remember how often this " key " of the Danube has been forced, and how often murderous battle has raged round these villages, up and down the hillsides crowned with ruined fortresses and castles.

THE IRON GATE OF MIGHTY ROCKS

The way gets more and more exciting and wonderful the farther we go. Now the bed of the river is wide and shallow like a large lake, now it is narrowed between steep rocks. Beautiful valleys open up on either side as the rivers hasten to join the main stream, often with the roar of cataracts. We feel quite afraid lest we run against the black rocks standing up from the bed of the river.

When we come to the Kazan Pass we are overwhelmed with the nearness of the steep mountain-sides reflected in the dark water beneath, and with the cliffs and their waterfalls, on which rainbows shine in the sun. Too soon we are out of the pass and at the Hungarian frontier-town Orsova, near which Kossuth buried the crown. A little way beyond Orsova is the famous Iron Gate of mighty rocks, and the canal through which the ships, with their black smoke, pass. We can hear the roar of the water through the gate afar off. There are many remains of Roman days scattered up and down Hungary, but none more impressive than the remains of the tremendous works of road-making they achieved about this part of the Danube. It was Hungary which undertook the enormous work of removing the great dangers of the Iron Gate, and making it fit for the shipping of Europe to pass through. The work took eight years, and was opened for traffic in the millennium year.

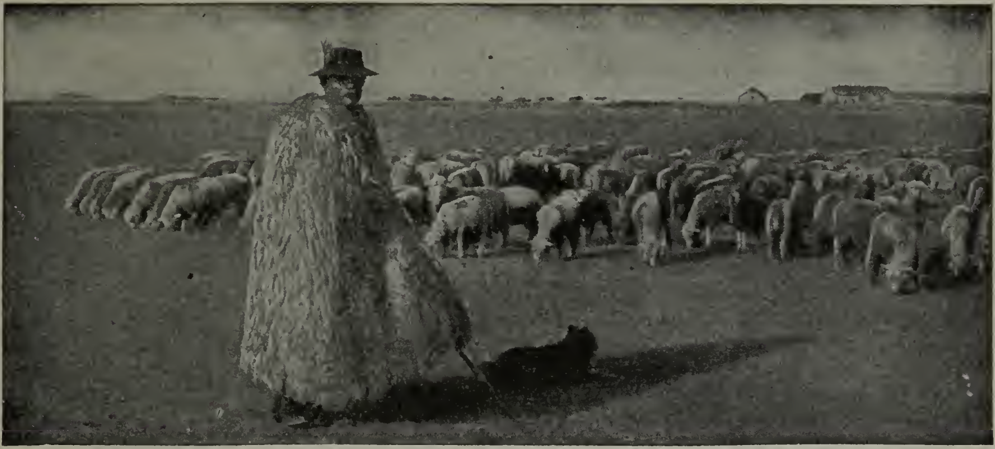
We would fain linger in Erdèly, the " forest-land " called Transylvania on our maps, that beautiful country of mountain and wood often spoken of as the Hungarian Switzerland, for we love pine forests, caves, old towns, and beautiful embroideries; and we would like to visit the birthplace of King Matthias.

THE PEOPLE OF THE PLAIN

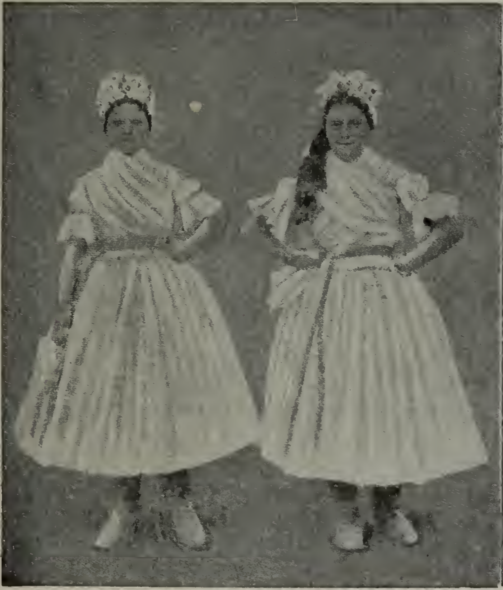
But the great plain calls, and for days we move from place to place, by train, and by alarmingly rapid driving along tree-bordered roads, through rich fields and green woods, by towns and hamlets and farms, till we find ourselves at Debreczin, the capital of the Lowlands. It is a fine large town of 100,000 inhabitants, and we are never tired of watching the people in their picturesque costumes, or of examining the delightful things to be bought in the quaint shops.

The sympathetic and graceful hospitality of the people is a pleasant memory for life, and it all seems to fit in with the beauty of those boundless plains under the widest expanse of sky we have ever seen. The model farms are wonderful, and on our daily excursions we get quite familiar with the sight of the herdsmen in their fine frieze coats, with their lovely charges, the foals and horses, that, when

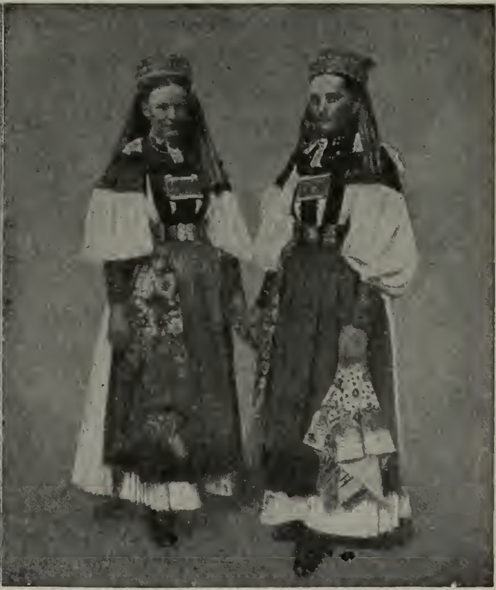
TYPES OF THE PEOPLE OF HUNGARY



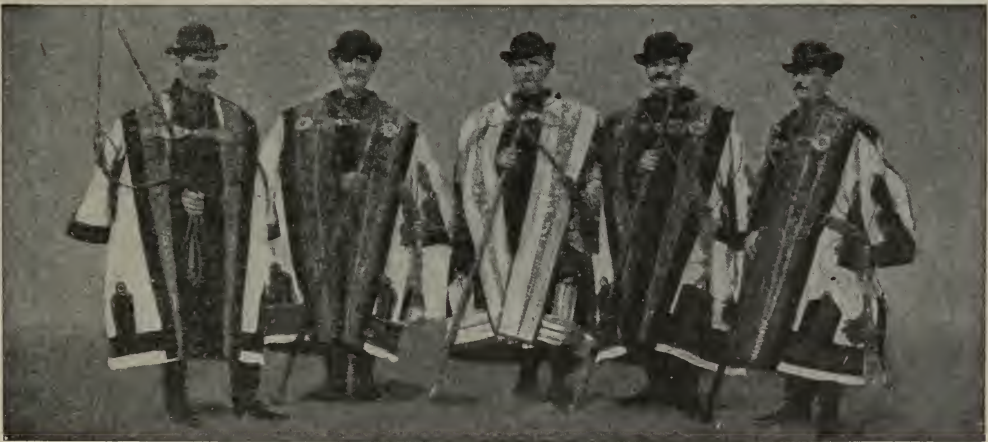
A HUNGARIAN SHEPHERD OF THE LOWLANDS IN HIS CURIOUS FUR CLOAK



PEASANT GIRLS OF THE HIGHLANDS



LOWLAND GIRLS IN HOLIDAY COSTUME



FARMERS WEARING THE ORNAMENTAL CLOAK WHICH IS THEIR NATIONAL COSTUME startled, seem to fly like the wind. These herdsmen, riding as if one with their steeds, are the last remnants of the original wandering Magyar folk who first settled in Hungary. They know no fear. Besides the horses, there feed on the plains great numbers of cattle, some of the beautiful milky-white kind with wide-spreading horns, whose ancestors came into the country with the Magyars. There are also herds of shaggy black buffaloes, and flocks of lovely black and white sheep.

THE CHARM OF A THOUSAND-YEAR-OLD LIFE

As we go along, we feel it almost sad to see the wide, grassy plains growing less as more and more land is ploughed and sown, and to note how often the sound of the tinkling cattle-bell, the crack of the herdsman's whip are drowned by the shrill whistle of the train. But there is still much left of the charm of a thousand-year-old life. It is only here and there that the smoke of tall factory chimneys spoils the delicious, bright, clear air with its scent of grass and meadow flowers, and the people have still the old-time virtues of hospitality and love of Nature. The great enjoyment of the evenings is listening to the soul-stirring legends and poetry of the plains, and to the thrilling gipsy music which accompanies the slow and fast dances which make gay the leisure time of the peasants, when labour is done.

We cannot leave Hungary till we have had at least a glance at the Carpathians, so we make our way northwards, past the vine country on the slopes of the low hills, past the ore hills, where furnaces and smoke in many mining towns and villages mark the doorways into Mother Earth's rich storehouses.

CAVES, MOUNTAINS, FORESTS, AND LAKES

We must turn aside to visit the marvellous ice cave of Dobsina, where we can skate on a vast real ice floor as smooth as a mirror in the hottest weather, surrounded by walls and roof of glittering, dazzling, unearthly beauty. Wonderful, too, is the stalactite cave. Five hours is all too short a time in which to see the halls and arches, the columns and pillars, all wreathed in the finest traceries of lace in stone.

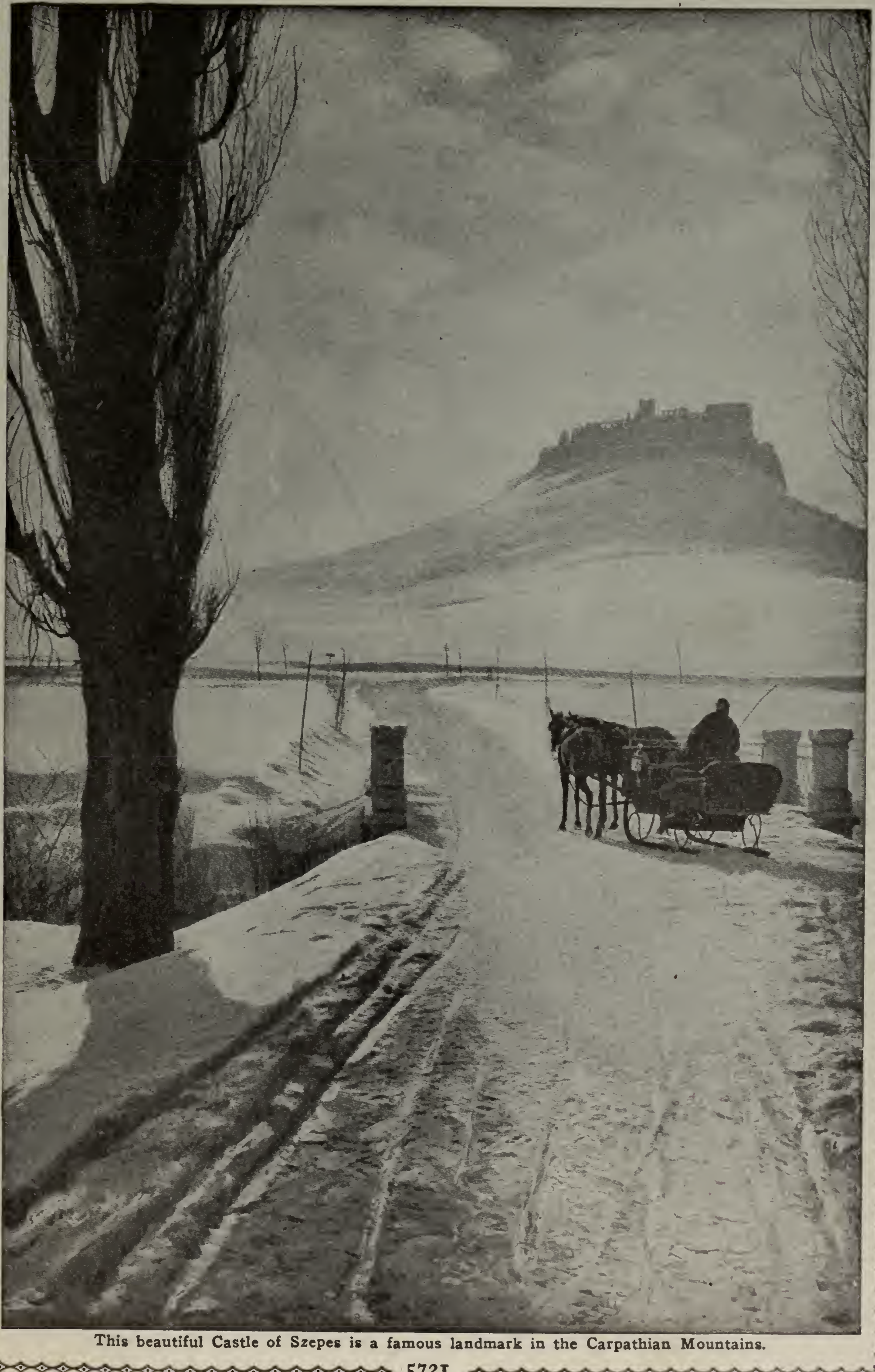
At last we arrive at the High Tátra district. It is not unlike Switzerland, but there are no glaciers, no magnificent, absolutely still and frozen solitudes. The mountains are not high enough for that. But we mount the High Tátra by cog-wheel railways, and gaze far and wide at glorious views over jagged hills and valleys, over countless "eyes of the sea" — the little mountain tarns — over splendid forests. There are fine hotels at the many health resorts in the district where people come from all over Europe to enjoy these delights, to boat on the lovely Lake Csorba, to drink the mineral waters, take the baths, and fill their lungs with the pure, life-giving air. Winter sports are skating, tobogganing, skiing in bright, still sunshine under a blue, cloudless sky.

It is but a short railway journey from the Tátra to Budapest, where we look round the museums again, for we want to look at the cowboy group again, and at specimens of the ores from the mines, and many prehistoric and Roman remains from spots we have visited. Then we say a too brief good-bye to St. Gellert, to St. Stephen, to John Hunyadi, to Széchenyi — often called the greatest Hungarian — and his fellow-heroes; and we spend our last days in Hungary on the shores of Lake Balaton, the largest inland sea of Central Europe. Delightful talks we have here with our Hungarian friends, watching the green-blue colours changing on the smooth mirror of the lake, the lights on the opposite hills, the children playing on the sandy shores, the glowing, dusky sunsets, the gleaming moonlight.

And every now and then, as we talk and dream on the shores of this great lake, we hear the melting strains of a gipsy band. The wild music sounds again and again, like the "motive" air in an opera, as the grand blue river rolls ceaselessly on, as the beauty of the mountains stands out in sunshine and storm.

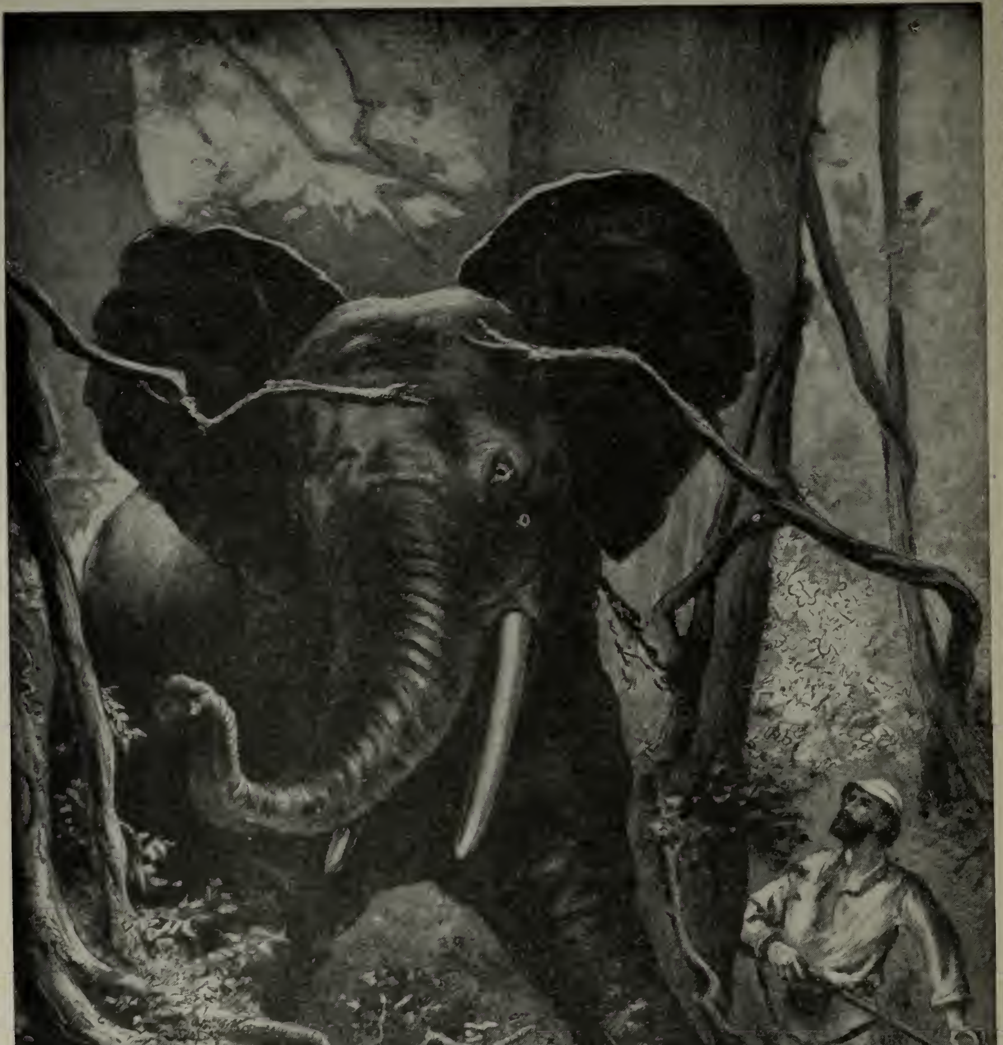
THE NEXT PART IS ON PAGE 5765.

A BEAUTIFUL PEEP AT THE WORLD



This beautiful Castle of Szepes is a famous landmark in the Carpathian Mountains.

THE GIANT OF THE FOREST IN A RAGE



An angry elephant is a terrible creature, and there is little hope for the traveller who gets in his way as he crashes through the forest, smashing down the trees.

A caravan in the forest attacked by fierce buffaloes

CONTINUED FROM PAGE 5628.

WHEN MAN MEETS THE BEAST

WHAT happens when an unarmed man meets a lion? Man has conquered the world and mastered the beast, but still there are times, in these days of travel and exploration, when men come suddenly upon the paths of a wild beast. In some parts of the earth wild life still lives on the edge of civilisation, and fierce animals, whose ancestors the early men fought, still stand in the path to challenge man if he dares to invade the forest and the plain.

Europe, in places, still teems with wolves; the tiger roams from India to Manchuria; the lion lords it over a great part of Africa; the leopard is feared and hated alike in Africa and India; America has the deadly jaguar and the puma or cougar; bears inhabit both the Old World and the New. A man unarmed in the wilderness to-day is as helpless against these savage creatures as his forefathers were. Firearms are our greatest protection.

India has a terrible death-roll every year as the result of the war of the tiger upon mankind. The natives are naturally timid, a fact that the tiger soon learns. Many tribes believe that a human soul is imprisoned in the body of the tiger, and this makes them more than ever unwilling to slay their deadly enemy. A belief of this sort is, as we all know, very old. A tiger does not attack human beings from the beginning of its career. Many a tiger goes through life without killing a man. Some take naturally to the crime, but generally there is some sort of cause for it. Perhaps the tiger, coming out in the evening when a native is driving cattle home, attempts to seize a cow or a calf. The native seeks to drive it away, and the tiger kills him at a blow. At once its fear of man is gone. It finds him the easiest of all creatures to kill, and from that time human beings are its prey.

Now, in Africa, when a lion takes to eating men, the more warlike tribes sally out in a great hunting party, and kill the enemy, though they may have to sacrifice several lives of men in the attempt. The native of India, however, is of different temperament. Unless some European comes along with a gun, he will tamely submit to the frightful work of the tiger, so that one tiger has been known to kill over a hundred people in one district.

Even with the best of firearms, man is often no match for the tiger, which is in many respects an enemy to man more to be feared than the lion. Though without such a fine armour of defence as the lion has in its shaggy mane and collar, the tiger has a more powerful jaw, and even a more terrible grip than the king of beasts; and the horror of an encounter with a tiger is heightened by the swiftness with which the creature acts.

The suddenness of a tiger's attack is, however, trying to the nerves of the bravest man. Sir Edward Bradford, who lived to tell the story of his adventure and afterward to command the police of London, had a horrifying experience of the speed with which a tiger, from being hunted, becomes the hunter. A tiger which he had been stalking was wounded, and crept along the dry bed of a river. Sir Edward sought to get down to the same level, but lost sight of the animal as it went round a rock. The tiger had, however, climbed up an unseen cattle-track, and, on reaching his level, charged furiously at Sir Edward, who tried to shoot the animal dead. Then a most unhappy thing occurred: a twig from an overhanging tree caught the trigger, and prevented the gun from firing.

A MAN IN A TIGER'S GRIP

The tiger seized Sir Edward by the left arm, and pulled him down and lay on him. The brave man had nerve enough to lie perfectly still, in order that one of his men, armed with a gun, might approach and fire, killing the brute as it lay upon him. Sir Edward lost his left arm below the elbow, but he was so keenly anxious to save his life at all costs that he did not feel the least twinge of pain. The mind in such a moment is so active in inventing ways of escape that it rises superior to physical suffering. It may not be so in every case, of course, but we know from many instances that this merciful provision of Nature is not uncommon.

This same merciful unconsciousness of pain was experienced by Livingstone, who had one of his arms badly bitten by a lion, yet felt nothing of it at the time. His brain was working so hard at a plan of escape that there was no room for thought of pain. Experiences like these and close observation of battles between animals have made careful thinkers believe that Nature is not so cruel as some people have thought; that animals killed by other animals do not suffer in their death conflict, but lose their lives in a painless struggle.

THE MAN WHO TOLD A LION TO STOP

But, whatever the facts may be, the terror of a conflict with a wild animal is hideous enough to make us pity the man who must endure it. A lion met by daylight is never so terrible as if encountered at night. A man of good nerve may get the better of lions when the sun is up, without firing a shot. Lord Randolph Churchill rode into a troop of seven lions, but they did not attack him. Another man was charged by a lioness which had been injured, and was, therefore, doubly savage. He had not time to reload his gun, but he stood still and faced the charging beast. He cried in a loud voice to her, "Halloa, there, steady, steady!" The lioness slackened her pace, puzzled, and a little alarmed. She was not used to the human voice, particularly a voice used in a tone of command. She came on again, however, and this time the man flung his arms above his head, and shouted still louder and still more firmly. This completely upset the lioness's nerve, and, instead of springing on the man, she stopped, and allowed him slowly to retreat, when she turned tail and disappeared.

There is another story of the way in which a hunter met a troop of lions when his gun was empty. The only thing handy was his telescope, and he flung this with all his might at the lions, yelling at the same time at the top of his voice. A cat will flee from the garden if we pretend to throw a stone at him, and these big cats in the African wilds were no more courageous. At the sight of the flying telescope they fled. To see a man throw a thing is probably to an animal like some terrible magic.

A MAN WHO WAS TAKEN IN HIS SLEEP

But men do not often escape so lightly as this. A lion once jumped

A POLAR BEAR DEFENDING ITS YOUNG AGAINST ARMED TRAVELLERS IN GREENLAND

THE TERRIBLE SPRING OF THE LION UPON ITS PREY

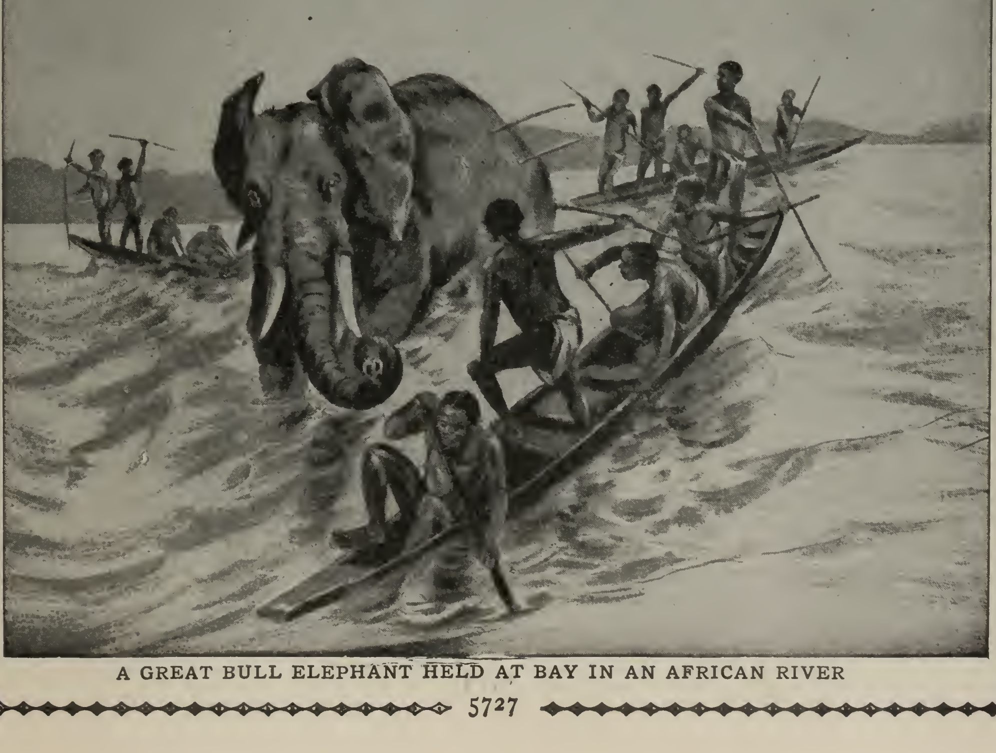
IN THE PATH OF THE RHINOCEROS

THE END OF A BLACK RHINOCEROS, WHICH CAN GALLOP LIKE A HORSE

THE GREAT WHITE RHINOCEROS CHARGING A PARTY OF TRAVELLERS

THE TERROR OF AN AFRICAN RIVER

THE HIPPOPOTAMUS, WHICH LIVES IN THE RIVERS OF AFRICA, ATTACKING A BOAT



A GREAT BULL ELEPHANT HELD AT BAY IN AN AFRICAN RIVER into an encampment, and seized a sleeping man. His cries aroused other men, and the lion was beaten off; but two or three hours later the lion crept silently back to the tent, and carried the man off, his comrades being unable to rescue him. The poor man was an English official who had been journeying to Uganda, where the lion has played sad havoc with human life.

Great Britain spent six years in building a railway through Uganda. The railway begins at Mombasa, on the coast, and ends 584 miles inland, at the great lake Victoria Nyanza. It runs through the heart of the wilds, where lions and leopards and other ferocious animals abound. It was a strange picture, the coming of this railway into this dark, mysterious land, where the conditions of life had scarcely changed since the dawn of creation.

The lions had no respect for the works of man; they preyed so terribly upon the men who were building the railway that at one time the whole series of operations had to be stopped. The British Empire was, for the time being, defeated by lions, who killed so many men as to cause panic in the camp, though the men could not justly be called cowards.

THE MOVING SHADOW ON THE RAILWAY

The lions advanced, roaring, upon the camp at night; then a great silence would follow, showing that the beasts were seeking a way in. In a few moments a terrible cry from the camp would tell that they had found a way, and everybody knew that there would be a man missing from the roll-call in the morning. In nine months the lions killed twenty-eight men working on the railway, as well as a large number of natives who acted as camp-followers. It is supposed that this destruction was wrought by two lions only, and it is satisfactory to know that these creatures were killed by a brave officer named Lieutenant-Colonel Patterson, who was an engineer engaged in building the line. Mr. Patterson has written a book on these and other African adventures.

THE ELEPHANT CAST OUT BY HIS COMPANIONS

It is always painful to hear of the wanton destruction of elephants, which, when tamed, are such faithful and intelligent servants of man. But there are pleasant elephants and unpleasant elephants. There is no more terrible animal in the world than the rogue elephant. This is an elephant which, for some reason or other, has become separated from the rest of a herd, and is not permitted by the others to rejoin. He becomes an animal outlaw. In his rage and disappointment the elephant will kill human beings out of sheer wickedness, rushing at them, knocking them down, and killing them either with its tusks, or pounding them flat with its great feet. A hunt was organised after an Indian species of this sort which, in the course of four years, had surprised and killed nearly fifty natives. It was a monstrous animal, and though pursued by thirty men riding on elephants, the animal charged again and again, and was not killed until eighty shots had pierced its body.

THE DREADED LEOPARD

Although the leopard is smaller than the lion or the tiger, it is really more feared than either. It will attack human beings more readily than either of its two larger cousins, and it is more terrible from the fact that it is a great tree-climber, which the lion and tiger are not. Where a monkey can go a leopard can follow, and from the branch of a great tree, where it lies so close as to be unsuspected, it springs down upon man or animal, ready to use its powerful jaws and claws with terrible effect. As a rule, leopards do not eat human beings — they are content to kill them; but once they begin this frightful pursuit, they are as much to be dreaded in Asia and Africa as the worst of man-eating tigers and lions. Not long ago two friends were sitting with a dog in an East African farmhouse at night, when a monster leopard sprang through the open window. Dazzled by the light in the room, it tried to make its way through the doorway, but managed, unfortu-

A TERRIBLE MEETING WITH A BUFFALO

The South African buffalo is one of the most terrible animals that man can meet. He is so fierce that he will charge a lion, and has been known to conquer the king of beasts.

nately, to shut the door instead. Then the leopard turned upon the farmer, and, knocking from his hand a chair which he had picked up, dealt him a blow on the scalp.

The poor man had no firearms ready, and could only fight with his fists. This had little effect, but the farmer's dog rushed to his assistance, and boldly attacked the leopard, driving it towards the door, which the farmer had now managed to open. Feeling a draught of cold air rush in, the leopard sprang for the opening, and bolted out of the room, with the dog still hanging to its leg.

JAGUARS AND PUMAS

The jaguar and the puma are to America what leopards are to Asia and Africa. The jaguar is merciless to human beings, killing where it does not need food. A jaguar strolled into a South American town one evening and walked into an open church. Presently a priest made his way in, and was immediately killed. A second priest went to seek him, and he, too, was killed. A third priest followed, but he, by rushing from pillar to pillar, managed to avoid the spring of the jaguar, and made his way to the door. Banging it behind him, he escaped, and gave the alarm. Part of the roof of the church was removed, and through the opening men were able to shoot the cruel beast within.

Though the jaguar was once common in North America it has become very rare. The puma or cougar is, however, found plentifully on both continents. This animal, often called the "mountain lion," is cowardly, but it can and will fight when cornered. Its cry is one of the most terrifying sounds the hunter hears.

These great cats are the worst animal foes of ranchmen on the American continents, for they cause terrible destruction among horses and cattle. Long, long ago, South America had native horses, but when the first Europeans landed in the country there was not a horse to be seen in the land.

It is now thought that the jaguar and puma were responsible for the destruction of the early American horses. Horses were wild in those days, and so did not have the protection of men.

A MAN'S FIGHT WITH A CROCODILE IN AN AFRICAN RIVER

In the water the animal most feared by man is the shark, but there is a fresh-water creature much more terrible than the shark, and that is the crocodile, which, when its victim struggles, swoops down upon him with a rush, and seizes him with its frightful jaws. It is not often that an unarmed man escapes from such an encounter, but one scarred native of Northern Nigeria lives to boast of a victory over a crocodile. He was the servant of an Englishman, and one night fell overboard from a boat into the river.

There was a frantic struggle. The crocodile was hungry and fierce, but the native saved himself by remembering an old lesson. He groped for the eyes of the crocodile, and managed to thrust his thumbs into them. The crocodile instantly let go, and the man then dragged himself ashore. He was found in the morning, and taken to a hospital. After he was cured the brave man travelled in search of his master, found him, and re-entered his service. He took with him a precious trophy, six teeth of the crocodile, which had broken off in the struggle, and become fixed in his scalp.

WHAT HAPPENED TO THE EARLY MEN

Struggles of this kind still happen from time to time in various parts of the world which civilisation has not yet conquered. They give us an idea of what must have happened in the days when the first men fought with beasts for life upon the earth. The nature of wild beasts has not changed, nor has their strength weakened. Man is lord of earth by the power of his brain, which has enabled him to make weapons more deadly than the brute force with which he is still compelled at times to do battle.

CONTINUED ON PAGE 5777.

The top of the Ural Mountains, where the tip of a fountain pen comes from

(CONTINUED FROM PAGE 5697.)

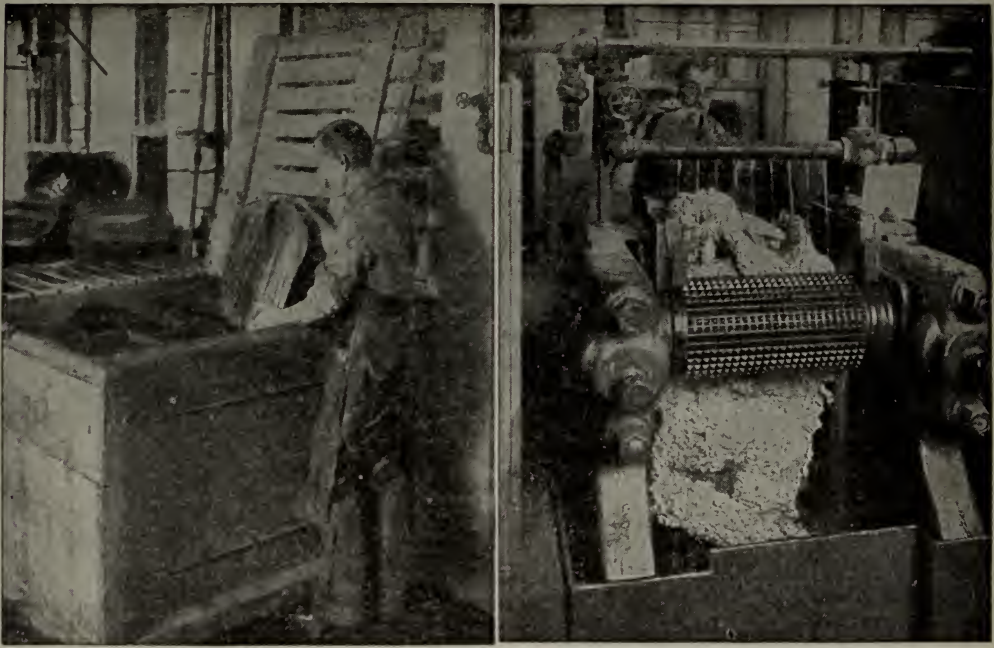
WHAT LIES BEHIND YOUR PEN

YOU pick up your pen to write a letter and put it down again, and perhaps, except for the words that it writes, it has never said a word to you. Yet a pen, which has been in the history of the world far mightier than the sword, has in it something of the very elements of which the world is made, something of the busy life of a great workshop, something of the quiet feeling of a library, something of the imagination of Sir Walter Scott, the large heart of Charles Dickens, the Nature-love of William Wordsworth, the pleasant general mind of Charles Lamb. We write with the chief instrument in the making of the history of the world, and we write a thing — a *word* — which, for all that we know, may be the seed of joy or pain when our hand guides a pen no more.

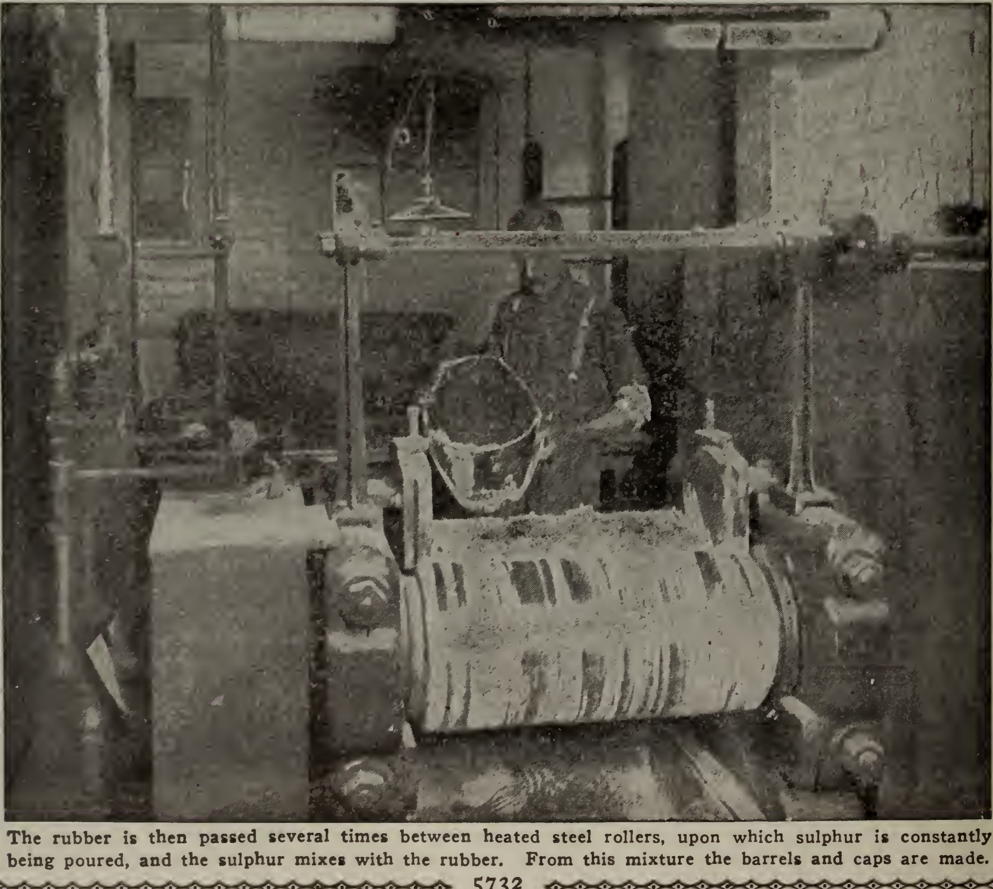
So let us think well as we take up our pen. We know not what may lie before it as it writes. But we know what lies behind it, and the thought should stir our minds. Most of us use the fountain pen in these days, though the old quill pen is still used by a few old-fashioned people. Our fountain pen is new, but parts of it are older than the first bird on which feathers for quill pens grew. Its nib is of gold, a very ancient metal, the search for which has led daring men to open up distant lands which, but for gold, might still be desert wastes. The nib is not all gold; it has a tip of iridium. This is a rare and costly metal won from the stony steeps of the Ural Mountains, and is of enormous age. It tips the pen which writes a letter that we send across the world; it tips the compass that guides the ship carrying the letter; it tips the contact-points of the telegraph which bears the message that the ship with our letter is coming.

The barrel of our fountain pen has a distinction that we may never have thought of — it is both vegetable and mineral. It comes partly from a great gloomy forest, partly from the blazing heart of a volcano. The barrel is made of vulcanite, or ebonite; it is composed of india-rubber, which is simply the sap of a tree. The rubber is made hard by the addition of sulphur. We can manufacture sulphur now, but the bulk of it has been made by Nature in her temper. Wherever we find volcanoes, there we find sulphur, created in the depths of rocks by volcanic action. Near Mexico City is a volcano with a crater nearly a third of a mile across and a sixth of a mile deep, and in it and all around it are vast quantities of sulphur.

THE VERY BEGINNING OF A FOUNTAIN PEN

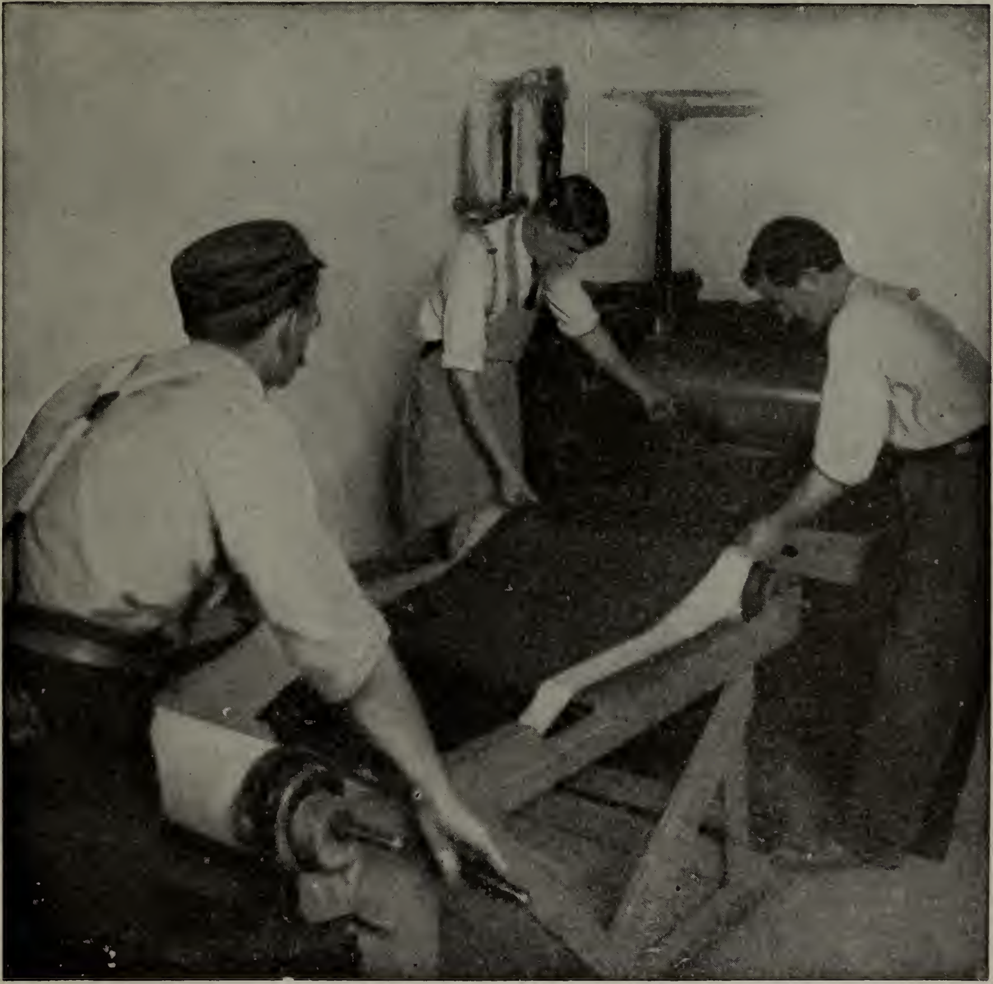


Most of us use fountain pens. In making one of these, india-rubber is used, and this has first of all to be washed by hand, as shown on the left, and then ground between corrugated rollers, as on the right.

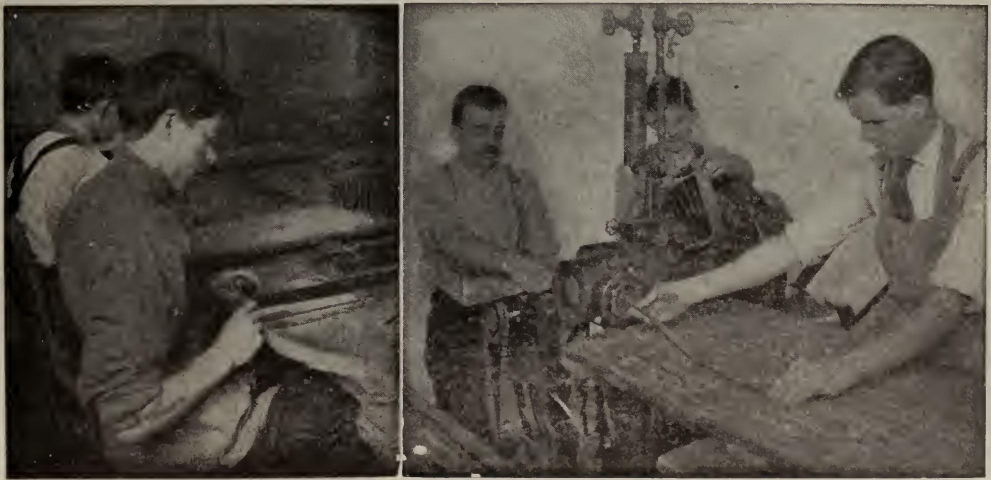


The rubber is then passed several times between heated steel rollers, upon which sulphur is constantly being poured, and the sulphur mixes with the rubber. From this mixture the barrels and caps are made.

HOT STEEL RODS TO MAKE THE BARREL

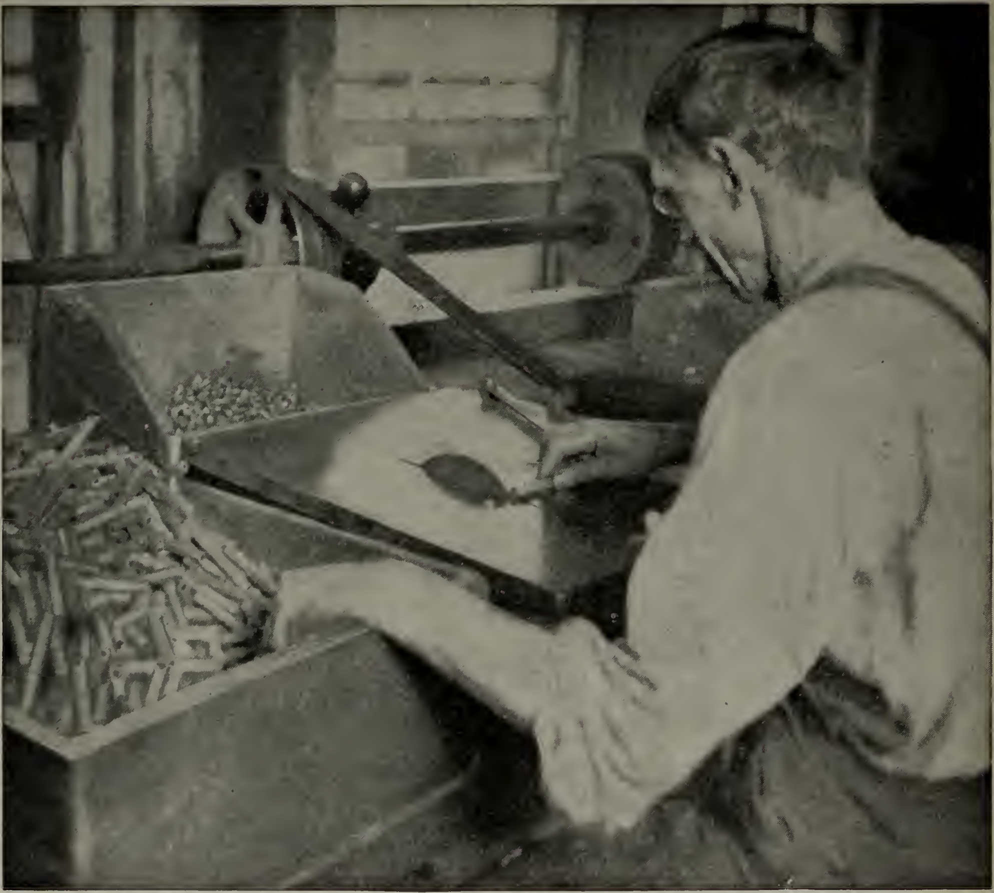


The rubber is rolled into a thin sheet as shown in this picture, which, with the other pictures on these pages, was taken in the factory where the famous Waterman pens are made. It is then cut into strips.

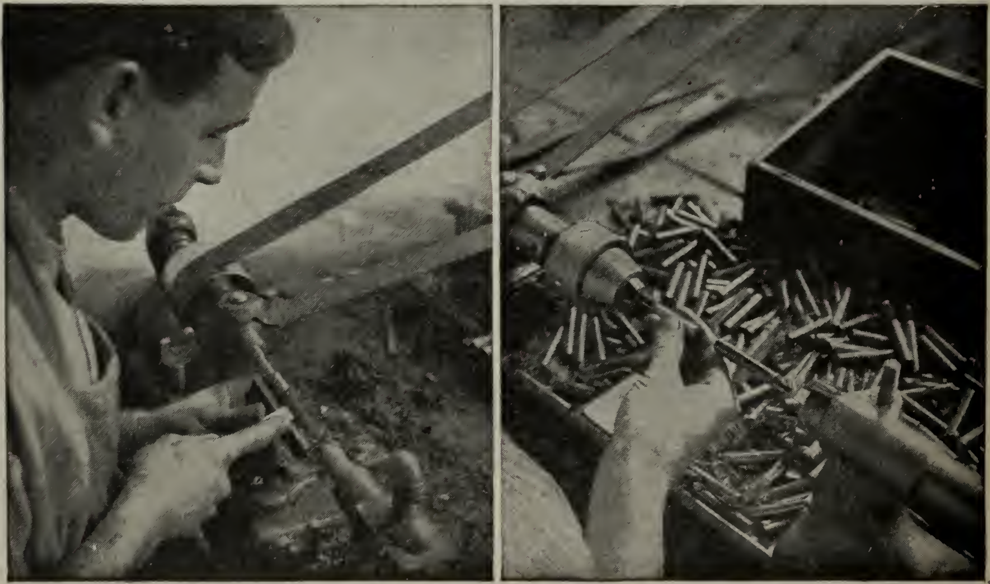


On the left we see a workman rolling the rubber round hot steel rods to make barrels for the pens; on the right the work is being done by machine. The covered rods are forced out in a continuous string.

CUTTING AND SMOOTHING THE BARRELS

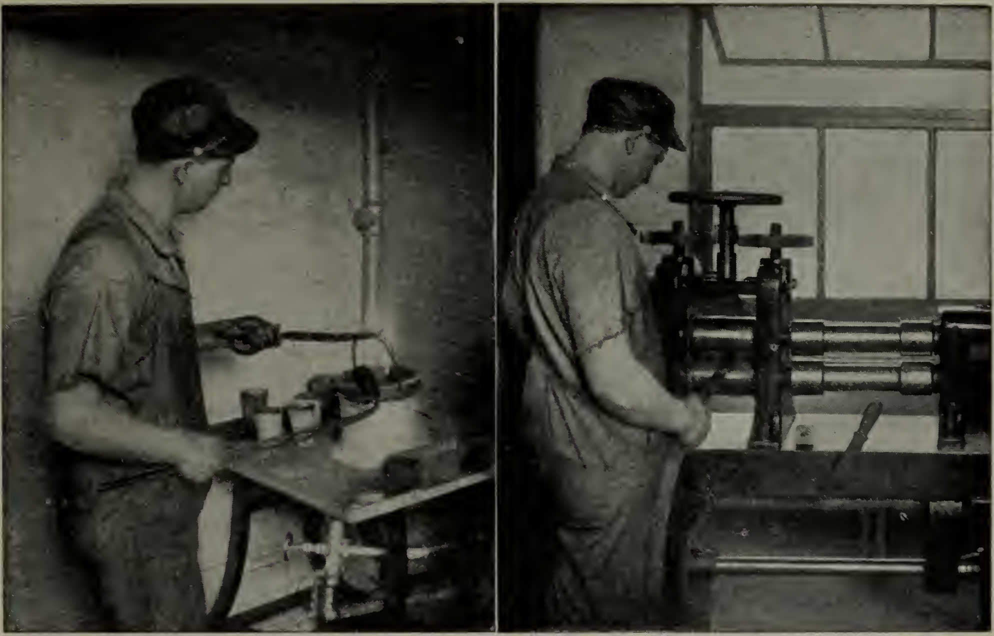


The rubber on each rod is covered with tinfoil to keep it in shape. The rods are then placed in ovens with more sulphur, after which the steel rods are withdrawn, and the tubes cut by a revolving saw.



The tinfoil is next scraped off on a lathe, as shown on the left, and on another lathe the inside of the tube, or barrel, is cut smooth, as seen on the right. Afterwards, the screw thread is cut on the barrel.

A PEN NIB WORTH ITS WEIGHT IN GOLD



The nib of a fountain pen is of gold, and the man in the picture on the left is melting gold and mixing it with silver and copper to harden it. After it has been cooled in moulds, it is rolled into thin strips.

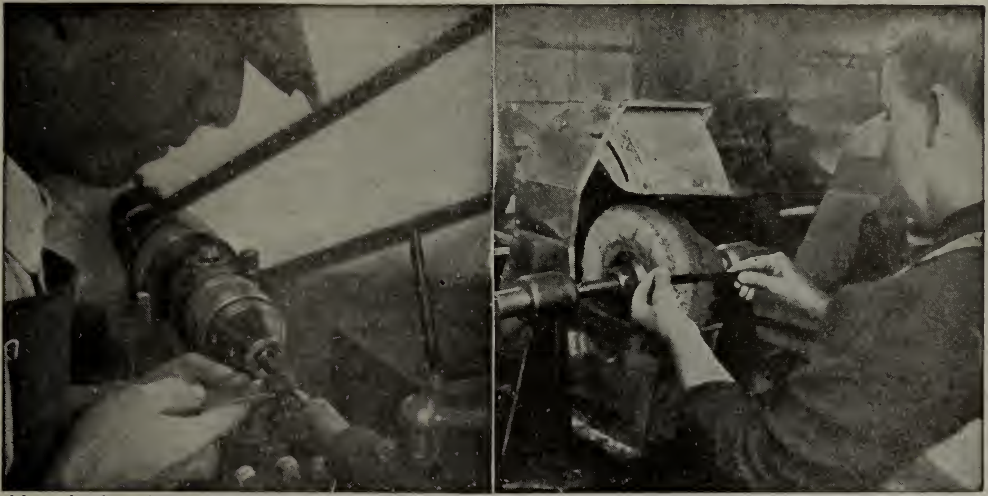
The flat shapes for the nibs are then stamped out by a machine like that which this man is working. A groove is made at the tip, so a point of iridium can be joined on. Iridium is a hard metal that wears well.

PEN POINTS FROM THE MOUNTAIN TOPS

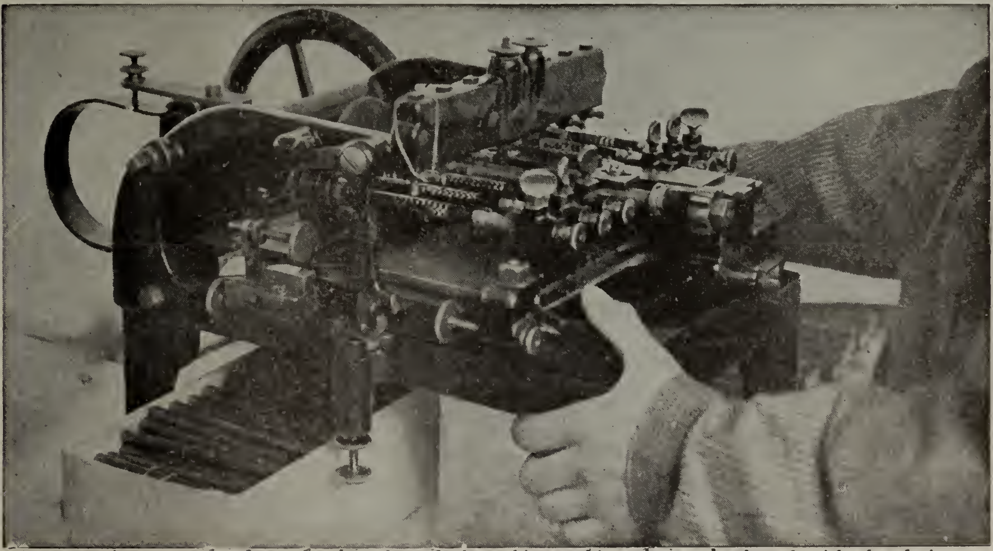
The points are placed by hand on the tips of gold nibs for the best pens, and afterwards fused on. The man uses a magnifying glass in putting on the tiny point. The nib is then rolled, slit, and burnished.

The man on the left is grinding the point of the nib. This is a very important and delicate operation, and upon it depends the usefulness of the pen. After the grinding, the nib is handed to the polisher.

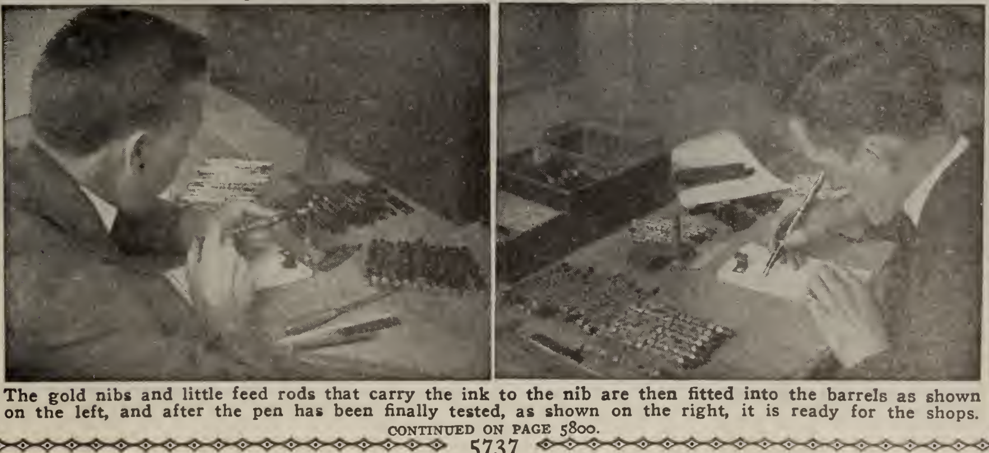
THE PEN IS READY TO MEET THE PAPER



After the barrel has been smoothed and the screw-thread cut upon it and upon the nib-holder, the two parts are put together and tapered as shown in the first picture on this page. The pen is then polished.



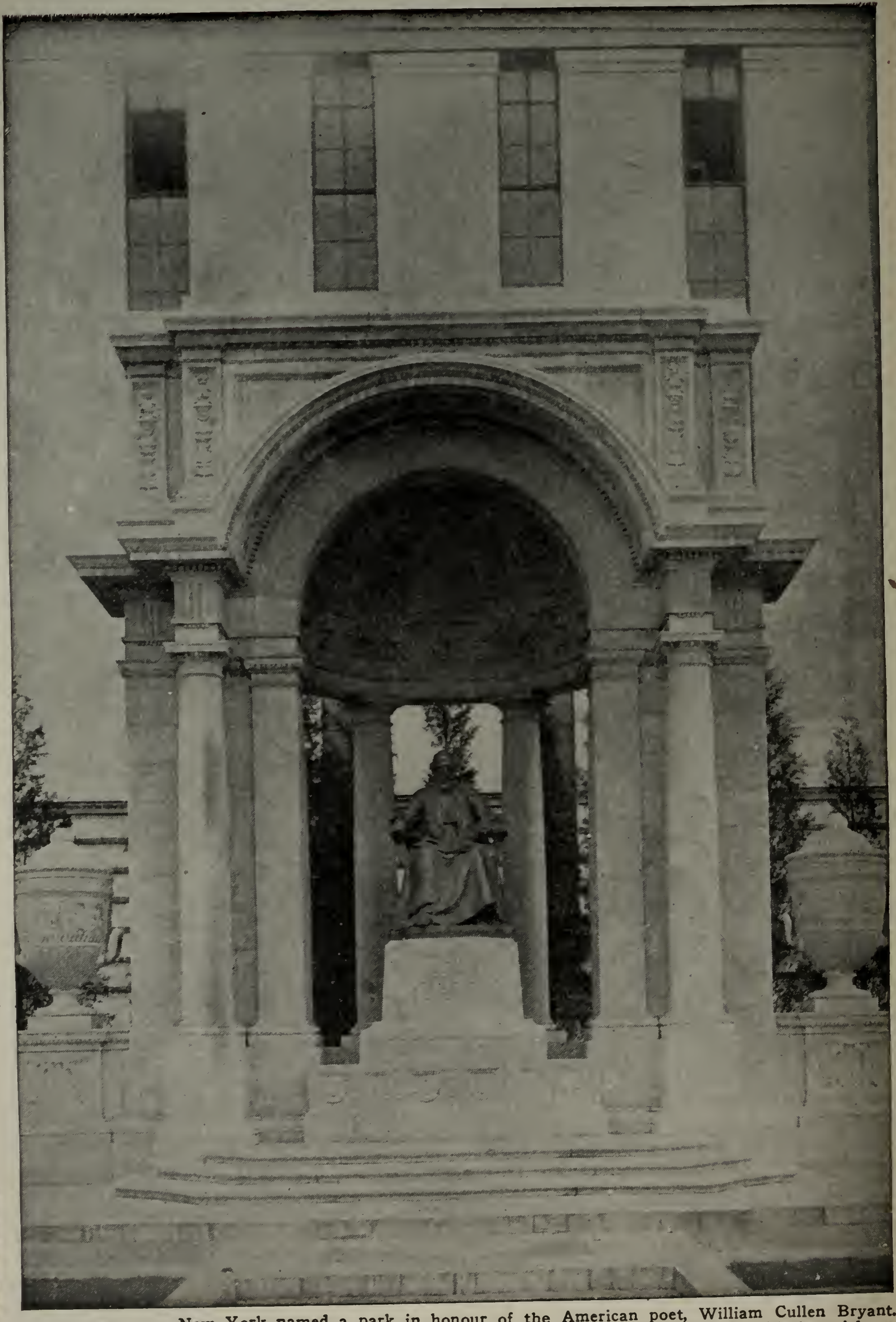
The name is next printed on the barrel, and then this machine chases the barrel with the design so familiar to users of this particular make. The cutting is done by a number of tiny diamond points.



The gold nibs and little feed rods that carry the ink to the nib are then fitted into the barrels as shown on the left, and after the pen has been finally tested, as shown on the right, it is ready for the shops.

CONTINUED ON PAGE 5800.

A STATUE OF WILLIAM CULLEN BRYANT



A few years ago New York named a park in honour of the American poet, William Cullen Bryant. The memorial has lately been completed by the erection of a statue of the poet by Mr. Herbert Adams. William Cullen Bryant wrote many beautiful poems of nature, among the best of which are "The Fringed Gentian" and "The Waterfowl," which can be found in our Book of Poetry.

THE DESERTED VILLAGE

"The Deserted Village," "She Stoops to Conquer" and "The Vicar of Wakefield" are the best known works of Oliver Goldsmith, author, poet and playwright. Born in Ireland, he went to Trinity College, Dublin, but was too idle and pleasure-loving to shine as a scholar. After leaving college he wandered through Europe, earning his bread and lodging by playing "merry tunes" on his flute. Throughout his life he was an impractical and self-indulgent man, always getting into scrapes, yet so lovable withal that many of the chief men of his day were his devoted friends. Carlyle calls his novel, "The Vicar of Wakefield," "the best of all modern idylls."

Sweet Auburn! loveliest village of the plain,
Where health and plenty cheered the labouring swain,
Where smiling spring its earliest visit paid,
And parting summer's lingering blooms delayed.—
Dear lovely bowers of innocence and ease,
Seats of my youth, when every sport could please—
How often have I loitered o'er thy green,
Where humble happiness endeared each scene;
How often have I paused on every charm—
The sheltered cot, the cultivated farm,
The never-failing brook, the busy mill,
The decent church that topped the neighbouring hill,
The hawthorn bush, with seats beneath the shade,
For talking age and whispering lovers made!
How often have I blest the coming day,
When toil remitting lent its turn to play,
And all the village train, from labour free,
Led up their sports beneath the spreading tree—
While many a pastime circled in the shade,
The young contending as the old surveyed;
And many a gambol frolicked o'er the ground,
And sleights of arts and feats of strength went round:
And still, as each repeated pleasure tired,
Succeeding sports the mirthful band inspired—
The dancing pair that simply sought renown
By holding out, to tire each other down;
The swain mistrustful of his smutted face,
While secret laughter tittered round the place:
The bashful virgin's sidelong looks of love,
The matron's glance that would those looks reprove:—
These were thy charms, sweet village! sports like these,
With sweet succession, taught e'en toil to please;
These round thy bowers their cheerful influence shed,
These were thy charm—but all these charms are fled.

Sweet smiling village, loveliest of the lawn,
Thy sports are fled, and all thy charms withdrawn;
Amidst thy bowers the tyrant's hand is seen,
And desolation saddens all thy green:
One only master grasps the whole domain,
And half a village stints thy smiling plain.
No more thy glassy brook reflects the day,
But choked with sedges works its weedy way;
Along thy glades, a solitary guest,
The hollow-sounding bittern guards its nest;
Amidst thy desert-walks the lapwing flies,
And tires their echoes with unvaried cries.
Sunk are thy bowers in shapeless ruin all,
And the long grass o'ertops the mouldering wall;
And, trembling, shrinking from the spoiler's hand,
Far, far away thy children leave the land.

Ill fares the land, to hastening ills a prey,
Where wealth accumulates, and men decay:
Princes and lords may flourish, or may fade—
A breath can make them, as a breath has made;
But a bold peasantry, their country's pride,
When once destroyed, can never be supplied.

A time there was, ere England's griefs began
When every rood of ground maintained its man
For him light labour spread her wholesome store,
Just gave what life required, but gave no more;
His best companions, innocence and health;
And his best riches, ignorance of wealth.

But times are altered; trade's unfeeling train
Usurp the land, and dispossess the swain:

Along the lawn, where scattered hamlets rose,
Unwieldy wealth and cumbrous pomp repose,
And every want to luxury allied,
And every pang that folly pays to pride,
Those gentle hours that plenty bade to bloom,
Those calm desires that asked but little room,
Those healthful sports that graced the peaceful scene.
Lived in each look, and brightened all the green, —
These, far departing, seek a kinder shore,
And rural mirth and manners are no more.

Sweet Auburn! parent of the blissful hour,
Thy glades forlorn confess the tyrant's power,
Here, as I take my solitary rounds,
Amidst thy tangling walks and ruined grounds,
And, many a year elapsed, return to view
Where, once the cottage stood, the hawthorne grew —
Remembrance wakes, with all her busy train,
Swells at my breast, and turn the past to pain.

In all my wanderings round this world of care,
In all my griefs — and God has given my share —
I still had hopes my latest hours to crown,
Amidst these humble bowers to lay me down;
To husband out life's taper at the close,
And keep the flame from wasting, by repose;
I still had hopes — for pride attends us still —
Amidst the swains to show my book-learned skill,
Around my fire an evening group to draw,
And tell of all I felt, and all I saw;
And, as a hare, whom hounds and horns pursue,
Pants to the place from whence at first she flew,
I still had hopes, my long vexations passed,
Here to return — and die at home at last.

Sweet was the sound, when oft at evening's close,
Up yonder hill the village murmur rose;
There, as I passed with careless steps and slow,
The mingling notes came softened from below;
The swain responsive as the milkmaid sung,
The sober herd that lowed to meet their young,
The noisy geese that gabbled o'er the pool,
The playful children just let loose from school,
The watch-dog's voice that bayed the whispering wind,
And the loud laugh that spoke the vacant mind —
These all in sweet confusion sought the shade
And filled each pause the nightingale had made,
But now the sounds of population fail,
No cheerful murmurs fluctuate in the gale,
No busy steps the grass-grown footway tread,
For all the blooming flush of life is fled —
All but yon widowed, solitary thing,
That feebly bends beside the plashy spring;
She, wretched matron — forced in age, for bread,
To strip the brook with mantling cresses spread,
To pick her wintry fagot from the thorn,
To seek her nightly shed, and weep till morn —
She only left of all the harmless train,
The sad historian of the pensive plain!

Near yonder copse, where once the garden smiled,
And still where many a garden-flower grows wild;
There, where a few torn shrubs the place disclose,
The village preacher's modest mansion rose.
A man he was to all the country dear,
And passing rich with forty pounds a year.
Remote from town he ran his godly race,
Nor e'er had changed, nor wished to change, his place;
Unpracticed he to fawn, or seek for power
By doctrines fashioned to the varying hour,
Far other aims his heart had learned to prize —
More skilled to raise the wretched than to rise.
His house was known to all the vagrant train;
He chid their wanderings, but relieved their pain;
The long-remembered beggar was his guest,
Whose beard descending swept his aged breast;
The ruined spendthrift, now no longer proud,
Claimed kindred there, and had his claims allowed;
The broken soldier, kindly bade to stay,
Sat by his fire, and talked the night away;
Wept o'er his wounds, or, tales of sorrow done,
Shouldered his crutch, and showed how fields were won.
Pleased with his guests, the good man learned to glow,
And quite forgot their vices in their woes;

Careless their merits or their faults to scan;
His pity gave ere charity began.
Thus to relieve the wretched was his pride,
And even his failings leaned to virtue's side;
But, in his duty prompt at every call,
He watched and wept, he prayed and felt for all;
And, as a bird each fond endearment tries,
To tempt her new-fledged offspring to the skies,
He tried each art, reproved each dull delay,
Allured to brighter worlds, and led the way.
Beside the bed where parting life was laid,
And sorrow, guilt, and pain, by turns dismayed,
The reverend champion stood. At his control
Despair and anguish fled the struggling soul;
Comfort came down the trembling wretch to raise,
And his last faltering accents whispered praise.
At church, with meek and unaffected grace,
His looks adorned the venerable place;
Truth from his lips prevailed with double sway;
And fools, who came to scoff, remained to pray.
The service past, around the pious man,
With ready zeal, each honest rustic ran;
Even children followed with endearing wile,
And plucked his gown, to share the good man's smile.
His ready smile a parent's warmth expressed,
Their welfare pleased him, and their cares distressed;
To them his heart, his love, his griefs were given,
But all his serious thoughts had rest in heaven.
As some tall cliff that lifts its awful form,
Swells from the vale, and midway leaves the storm;
Though round its breast the rolling clouds are spread,
Eternal sunshine settles on its head.

Beside yon straggling fence that skirts the way,
With blossomed furze unprofitably gay,
There in his noisy mansion skilled to rule,
The village master taught his little school;
A man severe he was, and stern to view,
I knew him well, and every truant knew;
Well had the boding tremblers learned to trace
The day's disasters in his morning face;
Full well they laughed with counterfeited glee
At all his jokes, for many a joke had he;
Full well the busy whisper, circling round,
Conveyed the dismal tidings when he frowned —
Yet he was kind, or if severe in aught,
The love he bore to learning was in fault.
The village all declared how much he knew;
'Twas certain he could write, and cipher too;
Lands he could measure, terms and tides presage —
And e'en the story ran that he could gauge;
In arguing too, the parson owned his skill,
For e'en though vanquished, he could argue still,
While words of learned length and thundering sound
Amazed the gazing rustics ranged around —
And still they gazed, and still the wonder grew
That one small head could carry all he knew.
But passed is all his fame: the very spot,
Where many a time he triumphed, is forgot.

Near yonder thorn, that lifts its head on high,
Where once the sign-post caught the passing eye,
Low lies that house where nut-brown draughts inspired,
Where gray-beard mirth and smiling toil retired,
Where village statesmen talked with looks profound,
And news much older than their ale went round.
Imagination fondly stoops to trace
The parlour splendour of that festive place;
The whitewashed wall, the nicely sanded floor,
The varnished clock that ticked behind the door —
The chest contrived a double debt to pay,
A bed by night, a chest of drawers by day —
The pictures placed for ornament and use,
The twelve good rules, the royal game of goose —
The hearth, except when winter chilled the day,
With aspen boughs and flowers and fennel gay —
While broken teacups, wisely kept for show,
Ranged o'er the chimney, glistened in a row.

Vain transitory splendours! could not all
Reprieve the tottering mansion from its fall?
Obscure, it sinks; nor shall it more impart
An hour's importance to the poor man's heart.

TO A BUTTERFLY

This little poem was composed by William Wordsworth at Grasmere on March 14, 1802, and it referred to the poet's childhood days spent in the town of Cockermouth with his beloved sister Dorothy, "Emmeline" being a fanciful name used by the poet instead of his sister's real name. It was true that Dorothy used to chase the butterflies with her brother, and it was because she told him in later years that she had been afraid of brushing the dust off their wings that he wrote these verses.

STAY near me—do not take thy flight!
A little longer stay in sight!
Much converse do I find in thee,
Historian of my infancy!
Float near me; do not yet depart!
Dead times revive in thee:
Thou bring'st, gay creature as thou art,
A solemn image to my heart,
My father's family!

Oh, pleasant, pleasant were the days,
The time when, in our childish plays,
My sister Emmeline and I
Together chased the butterfly!
A very hunter did I rush
Upon the prey—with leaps and springs
I followed on from brake to bush,
But she, God love her, feared to brush
The dust from off its wings.

THE TWO LIVES

One of the greatest truths in life is taught in these little verses by an unknown poet. They are a favourite recitation, and should be so, for no lesson will help us more in growing up than the lesson of equality which these simple lines teach. In the kingdom of heaven are neither rich nor poor, and in the sight of God it matters nothing which of us "lives in the terraced house" and which "in the street below."

TWO babes were born in the self-same town,
On the very same bright day;
They laughed and cried in their mothers' arms
In the very self-same way.
And both seemed pure and innocent
As falling flakes of snow;
And one of them lived in the terraced house,
And one in the street below.

Two children played in the self-same town,
And the children both were fair,
But one had curls brushed smooth and round,
The other had tangled hair.
The children both grew up apace,
As other children grow;
But one of them lived in the terraced house,
And one in the street below.

Two maidens wrought in the self-same town,
And one was wedded and loved,
The other saw, through the curtain's part,
The world where her sister moved.
And one was smiling a happy bride,
The other knew care and woe,
For one of them lived in the terraced house,
And one in the street below.

Two women lay dead in the self-same town,
And one had tender care;
The other was left to die alone
On her pallet so thin and bare.
One had many to mourn her loss,
For the other few tears would flow;
For one had lived in the terraced house,
And one in the street below.

If Jesus, who died for rich and poor,
In wondrous holy love,
Took both the sisters in His arms
And carried them above,
Then all the difference vanished quite,
For in heaven none would know
Which of them lived in the terraced house,
And which in the street below.

ST. JOHN BAPTIST

Arthur O'Shaughnessy was a brilliant young Irishman who bid fair to be a poet of enduring reputation, but died at the age of thirty-six, before he had fulfilled the promise of his early writings. He was born in 1844 and died in 1881, having been employed in the British Museum from his fifteenth year. In this noble poem on John the Baptist, the biblical references will not puzzle the young reader who is at all well versed in Bible stories. Elias, of course, is another form of Elijah, and the last lines refer to the prophet speaking with God in Mount Horeb.

I THINK he had not heard of the far towns,
Nor of the deeds of men, nor of kings' crowns;
Before the thought of God took hold of him,
As he was sitting, dreaming in the calm
Of one first noon, upon the desert's rim,
Beneath the tall, fair shadows of the palm,
All overcome with some strange inward balm.

He numbered not the changes of the year,
The days, the nights, and he forgot all fear
Of death. Each day he thought there should have been
A shining ladder set for him to climb
Athwart some opening in the heavens, e'en
To God's eternity, and see, sublime,
His face whose shadow passing fills all time.

But he walked through the ancient wilderness.
Oh, there the prints of feet were numberless
And holy all about him! And quite plain
He saw each spot an angel, silvershod,
Had lit upon; where Jacob, too, had lain.
The place seemed fresh, and bright, and lately trod;
A long track showed where Enoch walked with God.

And often, while the sacred darkness trailed
Along the mountains smitten and unveiled
By rending lightnings, over all the noise
Of thunders and the earth that quaked and bowed
From its foundations, he could hear the voice
Of great Elias, prophesying loud
To Him whose face was covered by a cloud.

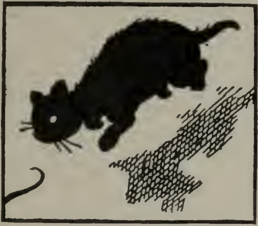
THE HOUSE THAT JACK BUILT

This is the house that Jack built

This is the malt that lay in the house that Jack built.

This is the rat that ate the malt
That lay in the house that Jack built.

This is the cat
That killed the rat that ate the malt
That lay in the house that Jack built.



This is the dog that worried the cat
That killed the rat that ate the malt
That lay in the house that Jack built.

This is the cow with the crumpled horn
That tossed the dog that worried the cat
That killed the rat that ate the malt
That lay in the house that Jack built.

This is the maiden all forlorn
That milked the cow with the crumpled horn
That tossed the dog that worried the cat
That killed the rat that ate the malt
That lay in the house that Jack built.

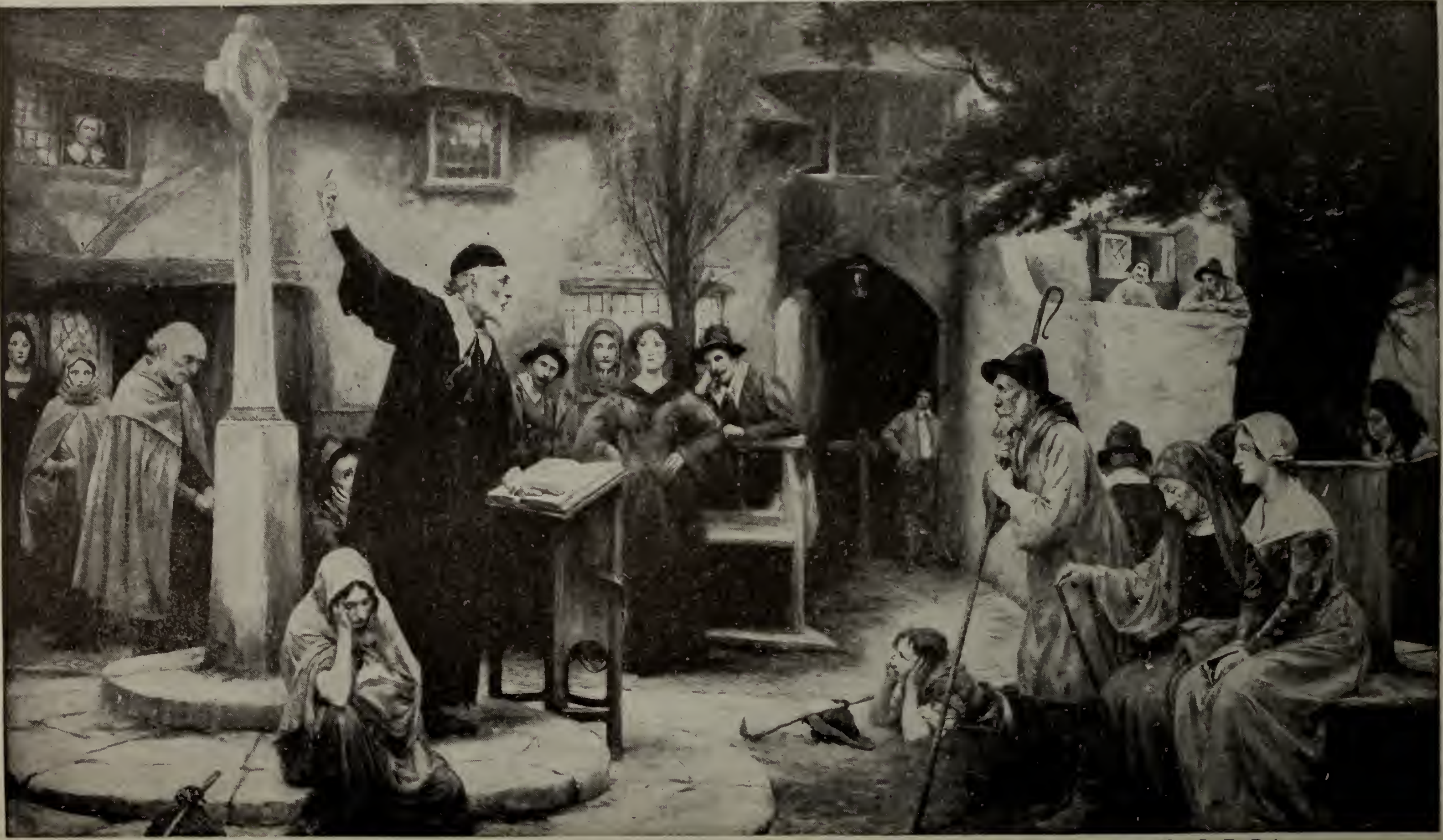
This is the man all tattered and torn
That kissed the maiden all forlorn
That milked the cow with the crumpled horn
That tossed the dog that worried the cat
That killed the rat that ate the malt
That lay in the house that Jack built.

This is the priest all shaven and shorn
That married the man all tattered and torn
That kissed the maiden all forlorn
That milked the cow with the crumpled horn
That tossed the dog that worried the cat
That killed the rat that ate the malt
That lay in the house that Jack built.

This is the cock that crowed in the morn
That wakened the priest all shaven and shorn
That married the man all tattered and torn
That kissed the maiden all forlorn
That milked the cow with the crumpled horn
That tossed the dog that worried the cat
That killed the rat that ate the malt
That lay in the house that Jack built.

This is the farmer sowing the corn
That kept the cock that crowed in the morn
That wakened the priest all shaven and shorn
That married the man all tattered and torn
That kissed the maiden all forlorn
That milked the cow with the crumpled horn
That tossed the dog that worried the cat
That killed the rat that ate the malt
That lay in the house that Jack built.

HOW THE BIBLE WAS READ TO THE PEOPLE IN SHAKESPEARE'S TIME



Preaching from the beautiful English version of the Bible at the village cross in Tudor times — From the painting by Mr. G. E. Robertson

CONTINUED FROM PAGE 5598

WAITING FOR SHAKESPEARE

When you go to Italy and visit Turin, you will stand on a hill outside the city — a hill crowned by the burying-place of the Italian kings — and you will see far off, arching you round, a great half-circle of snowy Alps. Here and there the ring of mountains sinks almost to a gap; then rises into a peak; sinks again to a level bank of whiteness; from which, presently, it sweeps up and up into a huge icy pyramid that seems to pierce the very heavens. After that it falls lower for a distance, but rises farther on into quite a cluster of mountain-tops, and so goes circling round, now higher, now lower, though never again so high as the sky-piercing sovereign peak of ice and light.

The risings and declinings of our English literature, judged by the best books, resemble that irregular mountain ring, the distances between the peaks being spaces of time.

Far off this panorama begins, with dimly-seen prominences like Caedmon. Then there is a long, low dip representing five hundred years, before the sky-line swells up into the first peak that can be called high, and that is well within our range of sight. That first commanding mountain stands for Chaucer. Now follows another decline, representing two hundred years; but as the range goes on it begins to rise and rise, and, ever rising, climbs at last to the loftiest of all the heights of literature — the sky-piercing summit of mankind's thought. That is Shakespeare.

The length of time to be represented after Shakespeare is only three hundred years, and it has been filled with a glittering cluster of lofty mountain forms, none, however, approaching the height and majesty and grace of the Shakespearian eminence.

Two hundred years after Chaucer had founded modern English book-writing — that is, by the year 1600 — our language had attained a glory unsurpassed. How was that rapid and wondrous growth brought about after so many barren centuries?

Glancing broadly over the world's history, we can see there have been periods when the human race has seemed to be worn out, stale, joyless, timid, with no fresh thought bounding towards hope and happiness. And then a period has followed when some part of mankind has been inspired by a new life, and has rushed the old world forward again, thrilling with fine feeling and eager expectation. It was so in the centuries that followed the life of Jesus. It was so in the century before Shakespeare.

Perhaps no age, unless it be our own, has ever been quite so wonderful as that century before Shakespeare. Great changes came to pass almost at the same time, and acted on each other. The capture of Constantinople, the capital of Christendom, by the Turks, drove the ancient learning of Greece and Rome, preserved in Greek and Latin, back to Italy for shelter, and men began to study eagerly the perfect writing of a thousand years before. At the same time printing was invented, and spread swiftly the means and the fashion of study. Immediately afterwards America was discovered, and the energetic began to feel that they were called on to explore, not only an old-world history they had forgotten, but a new world for travel, of which they had been unaware. Love of knowledge became a passion.

THE GREAT LOVE OF BOOKS THAT GREW UPON THE PEOPLE

Books were regarded as treasures, and crowds gathered to hear them read. The beautiful English Bible was the sweetest music ever heard on English soil, and the people listened to it gladly, as the precious book was read to them in churches, on the village green, or in the market square. The writings of far-off lands and generations were translated, and the lives of the great men of those days were retold. All the history and the tales that could be gleaned from the past were worked up into plays, and were watched with unflagging delight by people anxious to feed their new thought and hopeful energy. Admiration of the books that had brought thought from other days led men to wish to write books themselves. Delighting in reading, they began to delight in writing, too, and to hope that through their writings their names might be long remembered. It was into this animated, expectant, intellectual world that William Shakespeare was born.

HOW THE WORLD WAS PREPARED FOR THE COMING OF SHAKESPEARE

How extraordinarily the world was prepared for the coming of this great man we may see by examining a few dates. In the writings of Sir Thomas Wyatt, the Earl of Surry, and others, Italian forms, such as the sonnet, had been adopted, and English verse had been polished and made varied; and these new forms of poetry were available for anyone to study, for the first collection of English poems, by many writers, "Tottel's Miscellany," was published seven years before Shakespeare's birth. The best collection of such early poems, the "Paradise of Dainty Devices," was issued when Shakespeare was twelve years old; Hall's Chronicle, to which he went for parts of his English history, was printed twenty-two years before his birth; Holinshed's Chronicle appeared when he was thirteen; Stow's Annals when he was sixteen; and Plutarch's Lives, from which the poet took much of his ancient history, was translated when he was fifteen. Thus the materials for his work were ready.

It must not be forgotten that, immediately before Shakespeare began to write, another great poet, Edmund Spenser, had brought into English sweet melody, and "all that might delight a dainty ear." His "Shepherd's Calendar," in which were used "almost all the metrical forms with which later poets have made us familiar," was published when Shakespeare was a lad of fifteen. By Spenser and others verse had been given tunefulness and ease, and English literature was growing into a

stately tree,
Wherein the merry birds of every sort
Chanted aloud their cheerful harmony,
And made amongst themselves a sweet consort.

Something more must be said of Edmund Spenser, one of the most melodious poets who has used the English language.

THE MANNERS AND PEOPLE PICTURED IN SPENSER'S "FAERIE QUEENE"

He was a London lad, educated under a clever but vain schoolmaster, Richard Mulcaster, at whom Shakespeare used to laugh. The great Merchant Taylors' School was new in those days. Spenser gained the friendship of Sir Philip Sidney, the model of

THE WONDERFUL MIND OF SHAKESPEARE

"SHAKESPEARE NURSED BY TRAGEDY AND COMEDY" — FROM ROMNEY'S PICTURE

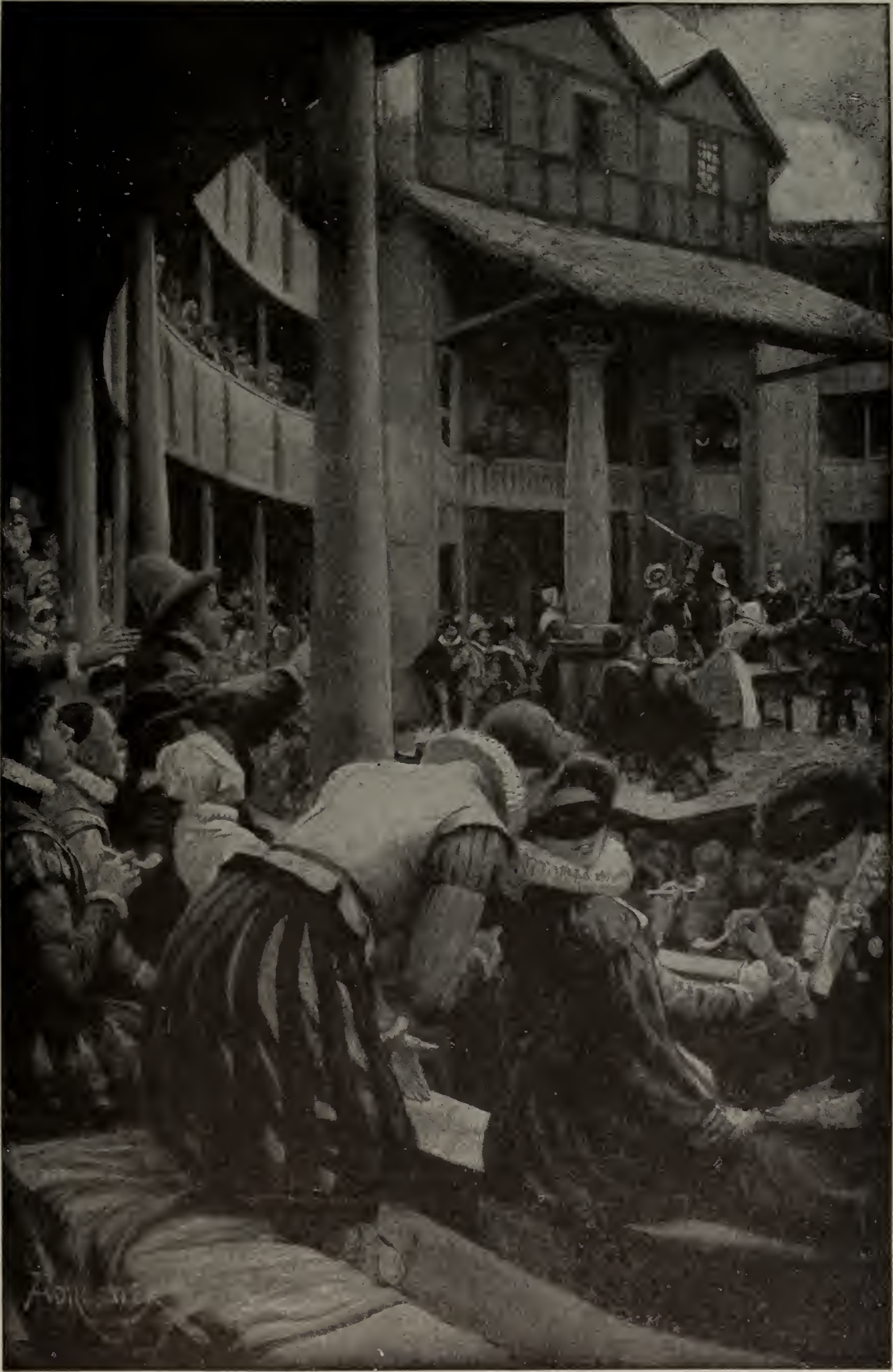
"SHAKESPEARE ATTENDED BY NATURE AND THE PASSIONS" — PAINTED BY ROMNEY
The artist has tried to show how Nature made Shakespeare's mind. In the lower picture the poet is between Joy and Sorrow. On the right are Anger, Envy, Fear; on the left Love, Hate, and Jealousy.

SHAKESPEARE IN ANNE HATHAWAY'S COTTAGE

SHAKESPEARE AT AGE OF 19 SITTING IN ANNE HATHAWAY'S COTTAGE AT STRATFORD

THE COTTAGE OF ANNE HATHAWAY, WHO BECAME SHAKESPEARE'S WIFE

THE THEATRE WHERE SHAKESPEARE SAW HIS PLAYS



A performance in the Globe Theatre, Southwark, where Shakespeare himself acted.

all that was noble, and a fine writer of the flowery language that seemed to fit the swelling hopes and fantastic romance of those buoyant days. Young Spenser became secretary to the Lord Lieutenant of Ireland, and lived many years in that country, then considered out of the way. Before going he published his "Shepherd's Calendar," and 11 years later his "Faerie Queene."

In the "Faerie Queene" virtues and vices, represented as persons, enter into conflict after the manner pictured in old romances. Holiness and truth, faith, hope, temperance, chastity, love, justice, and courtesy engage in combat, or are associated in dangerous adventures with falsehood, unbelief, lawlessness, pride, intemperance, and other ill-favoured adversaries. It is a book of flitting shadows and the gossamer textures of fancy. Its poetical motion is so smooth and soft-footed, as if to the tinkle of elfin bells, that at last it makes us dreamy by its soothing melody. This "poet's poet" brought unsurpassed grace into our language in the days of its exultant youthful strength. Here is his description of the Bower of Bliss of an enchantress, and its sweet sounds, all harmonised, may serve to illustrate the melody of Spenser's verse, as well as his style and metre.

Eftsoons they heard a most melodious sound,
  Of all that might delight a dainty ear,
Such as at once might not on living ground,
  Save in this paradise, be heard elsewhere;
Right hard it was for wight which did it hear
  To rede what manner music that might be;
For all that pleasing is to living ear
  Was there consorted in one harmony—
Birds, voices, instruments, winds, waters, all agree!

The joyous birds, shrouded in cheerful shade,
  Their notes unto the voice attempted sweet;
Th' angelical soft trembling voices made
  To th' instruments divine respondence mete;
The silver-sounding instruments did meet
  With the bass murmur of the water's fall;
The water's fall, with difference discreet,
  Now soft, now loud, unto the wind did call;
The gentle warbling wind low answeréd to all.

Edmund Spenser, though greatly admired, was never rewarded, and the ending of his life was sad. Driven from Ireland in danger of his life, he arrived in London broken down by anxiety, and died almost at once, perhaps in poverty, before his London friends were aware of his condition. But they buried him in Westminster Abbey, by the side of Chaucer, thus founding the Poet's Corner.

To understand this age into which Shakespeare came we must realise how much the theatre meant to the people of his day; how the seeing and hearing of plays was to them what histories and newspapers and fiction are to us, and how the writers of plays thought only about making their words sound true and impressive when spoken and acted. He was a boy of twelve when the first theatre was built in London, and in his lifetime the playhouse became a seed-ground for the growth of popular knowledge, the mouthpiece of romance, and the outlet for genius. It had been made more popular and dignified by the playwriting of a wild Cambridge student, Kit, or Christopher, Marlowe, son of a Canterbury shoemaker. Marlowe gave up what he called "jigging rhymes," and used in his historical dramas "blank verse," an unrhymed form of poetry with five beats to the line, which ever since has been in English the classic measure for stately, poetical plays, and for works of imagination shaped with dignity.

So materials, methods, opportunities were all prepared for Shakespeare. A new-born wonder-loving world waited for a great mind; and at that moment was born one who could read the hearts of men and women and picture them so that they live for ever before our sight, in all their ambition, majesty and pride, passion, folly and meanness, loyalty, loveliness, tenderness and merriment.

CONTINUED ON PAGE 5901.

Glasgow University, where Lord Lister began to think of his great work

CONTINUED FROM PAGE 5710

STORY OF LORD LISTER

THE MAN WHO SAVED THE WORLD FROM PAIN

We may say that, of all men engaged in the affairs of life, Lord Lister has been one of the greatest friends of humanity. We rightly respect the memory of men who have given us railways and steamships, telegraphs, telephones, and other wonderful inventions; who have added to the wealth and comfort of the people by their thought and labour. But we owe thanks to Lord Lister for greater benefits even than these. We owe him gratitude for health to enjoy the benefactions which these other great men have conferred upon the world. Great inventions are of no use to us if we cannot live to enjoy them. Lord Lister is the man who, by years of study and loving labour, gave the world a key to life and health such as it had never previously possessed. What is his great secret? What is the magic which has enabled him to save more lives than any other surgeon that has ever lived? It is his marvellous gift for taking pains, his brilliant faculty for seeing first causes in things other men overlooked.

It is a wonderful story, which will be told with appreciation as long as the history of surgery is recorded. To see what he has done, we must remember the position from which he started. The old-time doctors were often as ignorant as their patients. They believed in magic, and thought that spells and charms effected cures. It is marvellous that, with such doctors as these, the human race did not become almost extinct. Plague and pestilence did, from time to time, blot out the population of towns and districts. One plague in England carried off half the population of the big towns, another was so severe that the king and court fled to France, while the Great Plague destroyed over 60,000 lives in London alone. The doctors could do nothing, or next to nothing, to stay the ravages.

When the knowledge of medicine and surgery improved, along with knowledge in other branches of life, excellent surgeons appeared in many countries. Harvey's discovery of the circulation of the blood slowly but surely brought about a revolution, and a surgeon became a man worthy to be honoured. He was no longer half quack, half conjurer; the really worthy doctor became a serious student, and treated the human body with the same diligent and intelligent care that other scientists devoted to *their* studies. Surgery became a science of which men might be proud. But up to this time the great secret of anæsthetics — drugs which make us unconscious of pain — had not been discovered. Every operation had to be borne by the patient while fully conscious.

It is dreadful to think of it. If a little child met with an accident which made it necessary for a doctor to operate — say, for a broken arm or leg — the poor little sufferer had to endure the horror and agony of the ordeal with nothing to deaden its pain. It was quite impossible to perform many operations upon deep-seated organs, for the patients could not bear the pain and shock.

The discovery of the pain-killing effects of chloroform and other drugs changed all this. Sir James Young Simpson in England, and Doctors Long, Wells and Morton, in the United States, were the men who made possible this improvement in the surgery of the nineteenth century. It was, indeed, one of the greatest things in the history of mankind, for now the surgeon was able to attempt operations which previously had been quite impossible.

The surgeon could now go slowly and carefully to work; he need not race through an operation for fear the patient should die of shock or exhaustion in the middle of it. He could make sure of what he had to do; he could alter his plans, if necessary, when the operation revealed conditions of which he had not previously known. Mercy and skill gave the doctor new weapons which had never been dreamed of.

Where, then, lay the marvellous feats of Lord Lister, if improved surgical skill and the introduction of chloroform and ether had already done so much? It was in 1847 that operations under chloroform began to be performed in England. Joseph Lister was then twenty years old, having been born at Upton, Essex, which is now part of Greater London. We might imagine, at first sight, that surgery had won all her victories before Lister came into prominence. But it was not so. Her greatest trial had yet to come. Lister began his training at an age when he was able to see all the wonders of anæsthetics, and to see, also, the terrible results which followed the new discovery. Lister's father was a successful merchant of a scientific mind, who had studied the microscope and improved it from a mere toy into an instrument of great value to the scientist.

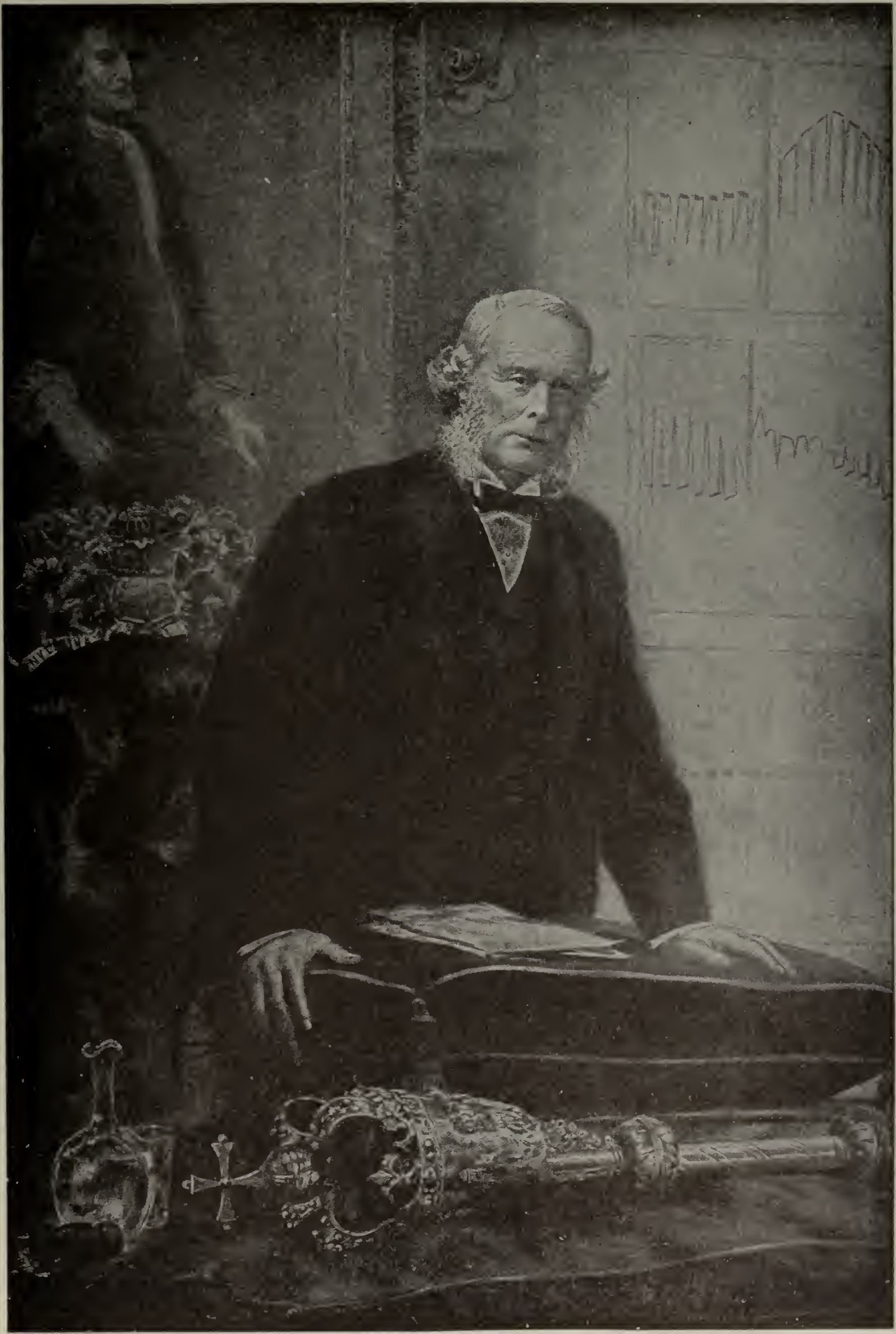
Hitherto, it had been simply a couple of lenses which magnified, but, in magnifying, distorted the images seen through them. The elder Lister made it a beautiful instrument of enormous value, an instrument without which science would often be helpless. The son inherited his father's love of study, and was early destined for surgery. He took his B. A. degree at London University in the year which saw the introduction of the use of chloroform into surgery. Continuing at the university as a medical student, he devoted himself to the more complex problems of medicine and surgery, and became house surgeon at University College Hospital. Here there occurred an outbreak of what was known as hospital gangrene. This was the terrible scourge which followed chloroform. It had nothing to do with chloroform or other substances used for destroying pain at operations. The growth of the new terror was due to the fact that the number of operations enormously increased.

People who had shrunk from operations before now clamoured to be operated upon, not only in the case of injuries, but for the cure of disease. Their fear was much lessened now that the thought of pain was removed. But soon this new foe to life appeared. It had been present before, but had not been noticed because the operations before chloroform came into use had been comparatively so few.

It was noticed now that whenever a wound was made, whether by accident or by the surgeon's instrument, the wound was often attacked by terrible disease, blood-poisoning followed, and death frequently resulted.

Nobody could account for it. Nobody knew what caused it. Simpson, who had introduced the use of chloro-

THE MAN WHO HAS SAVED A MILLION LIVES



It is probably no exaggeration to say that Lord Lister, the great English surgeon, has saved a million lives, for without his wonderful discoveries nine-tenths of the operations that are performed in the hospitals of the world would result in death. He showed how the fatal poisoning of wounds, which nearly always followed operations, could be avoided, and the whole world honours him for his splendid work.

form, was horrified at what he saw. He gave years of the latter part of his life to dealing with the evil. He thought that the air of hospitals became corrupt, and that to get rid of the evil we must burn down all the hospitals and build new ones. It would not do, he said, to have a hospital standing for long.

Meanwhile, Lister quietly studied, and said nothing. Many great minds were turned to the matter, for the trouble did not exist in one country alone. The use of chloroform had spread to the hospitals on the Continent, and there the death-rate was as high.

Hospital gangrene, as it was called, became epidemic at all the hospitals. Out of every hundred persons operated upon, from sixty to seventy died; and at last not only did patients become frightened at the thought of an operation, but the doctors themselves became afraid of their own work.

But no, not all of them. Joseph Lister, of whom no one had heard, was the man who would not be defeated. He went to Scotland when he was still a young man. There was a great surgeon in Edinburgh, Professor Syme, and Lister was advised by a friend to "go and take six weeks under Syme." He went when he was twenty-six, but he stayed for years. He was strongly attracted by the great man whose student he became; and the older man much admired the talented, earnest young Quaker doctor, and gave him his daughter in marriage. On the advice of Syme, Lister accepted an appointment in Scotland, which led to his gaining a professorship of surgery in the Glasgow University. In Glasgow "hospital fever" was raging. The infirmary, like other places, was haunted by pestilence, and the young professor gave the matter all his attention. He saw that death followed an operation only if the skin were cut or broken. Thus, a man would be admitted with a fractured leg.

If the skin were not broken he would recover and go his way rejoicing. In the very next bed there might be a man suffering from no worse an injury, but in this case the skin had been broken, and that man would, in all probability, die. The whole medical profession was in a panic, for doctors had come to recognise that if a patient recovered from an injury in which the skin was broken, it was by chance only, and nothing more. The doctors thought that the air, by coming in contact with the wound, destroyed the inner flesh, and so set up poisoning, which caused death. Some of them kept wounds swathed in linseed poultices. Others arranged bags of water so that a constant trickle of fluid ran over the wound. But still deaths kept occurring. We must remember that at this time men did not know that there are microbes nearly everywhere, in the air as well as in everything else. The microscope which Lister's father had made showed them that microbes occurred in the wounds that caused death, but the doctors thought that these wounds caused the microbes; they did not know that those microbes could come *only from other microbes,* like themselves. They thought that life could spring from nothing. They had to learn that life comes only from life. The great discovery that there are microbes everywhere, and that these microbes cause changes in solid substances and in liquids, came to us from a great Frenchman named Pasteur. Lister, who had been working away at the problem all the time, had gone already far toward the truth. Armed with this knowledge, he attacked the deadly foe with new strength. He declared that men must not blame the hospitals; they must not blame the air;

UNIVERSITY COLLEGE HOSPITAL
Lord Lister was house-surgeon here

they must blame themselves and their own methods for the destroyer that stalked in their midst. In a word, he said, "Be clean!"

It was not so simple a message as that at first. He saw at once that more careful methods must be employed, but he could not know at first that the whole business might be so simple. He saw that if he could keep these dangerous microbes from the wound, the patient would be able to recover. Ah, but how to do it? A microbe is not to be seen by the eye: microbes are so small, and they are so many; how were they to be kept away? A new creation, called carbolic acid, was called into service. With this he made a sort of crust over a wound.

How anxiously he awaited results we may imagine. He was setting up his opinion against the opinion of the whole surgical world, and he ran the risk of general condemnation and ridicule. Fancy plastering a wound with carbolic acid! they said; was ever such a thing heard of? With the greatest concern, therefore, our hero watched the progress of the wound which he had thus treated. To his intense delight, he found that his treatment was perfectly successful. Under its protecting crust of carbolic acid the wound progressed as healthily as if the skin had not been broken.

But he was not so unwise as to think that the goal had been thus easily reached. He soon saw that though carbolic acid would keep poisonous germs from a wound, carbolic acid in itself was a bad thing to bring in contact with the raw flesh, for it was so strong that it prevented the tissues from healing as readily as he hoped.

A new and better way must therefore be sought. He determined next to attack the air itself, to rid it of the microbes which it contained. He invented a spray by which carbolic acid could be scattered over the air of the room. This seemed successful, and many men would have contented themselves with the knowledge. But Lister reasoned the matter out. Every inch, every fraction of an inch of the air in a room, he now knew, was peopled with microbes. How, then, could he expect that his spray, which covered only a limited area of the room, was purifying the entire atmosphere of the apartment.

Gradually, after many experiments and trials, he came to realise that it was not the *air* which had to be feared. It was the surgeon himself, his instruments, his hands, his clothes, which needed the most careful treatment. He had instruments made which could be taken to pieces and boiled; he made all his doctors wash in chemicals which would kill any germ upon them. He had all towels and bandages and dressings sterilised; everything that came near a wound was treated in this way. Then he found that he could do away with the carbolic acid on the wound itself, he could do away with the carbolic spray, he could dispense with all the hindrances with which a less careful and painstaking inquirer would have hampered himself.

No great reform in the world was ever carried out without opposition, and of course Lord Lister was opposed, ridiculed, and attacked. Each alteration that he made in his methods was hailed with delight by his opponents, who declared that each was a departure from the ridiculous proposition with which he had set out. It was all too simple, too absurd for them. They believed in nasty sour poultices, in fantastic arrangements of running water; they would almost have agreed to pull down the hospitals.

If his own countrymen would not believe him, men of other nations did. The Germans sent over their students to learn of him, and his methods soon spread to the German hospitals, with results as wonderful as those of Lord Lister himself. In those, as in the hospitals in which Listerism was practised in England, the pestilence was struck down. Operations were successfully conducted; the patients got completely better. Gradually the methods of Lord Lister prevailed in his own country. It became recognised that if an operation, skilfully performed, were followed by inflammation or by blood-poisoning, then it was generally the doctor who was to blame. It meant that he had introduced injurious germs, either with his instruments or by other means, into the wound, and that he had not been as vigilant as he ought to have been.

The effect upon the practice of surgery throughout the civilised world has been more than most of us at this time can realise. The marvel of it can be understood only by those who were men and women fifty years ago. Your grandfathers can remember the cry for the destruction of the hospitals; they can remember the time when even a great surgeon was accustomed to say that to save the life of a patient it was better, in the case of a compound fracture of the leg, to cut off the injured limb at once; they can remember when a great doctor declared that a man in a fearful battle was in less danger of death than he was in the operating theatre of a hospital. All these terrors have been swept away as by magic, solely through the labour and teaching of Lord Lister.

Lord Lister has been honoured by the whole civilised world. His visits to the great cities of the Continent have been welcomed as if he had been some conquering king. And that in truth is what he has proved — a king conquering disease and death in some of its saddest forms. Every child who has to undergo a surgical operation should bless the name of Lister, for without the Lister treatment death would very likely result. He has been the sovereign friend of children as well as of men and women, young and old. Without his aid, anæsthetics would have become valueless. Helped by Lord Lister, the doctor now carries on his noble work without pain to the patient, redeeming from the grave the sick and suffering who, forty years ago, must certainly have died. There are surgeons who can boast that they have never lost a life. That is the sort of triumph that we owe to Listerism, for until the days of Listerism doctors would never have dared to attempt the operations which they now perform with perfect safety and success.

ONE OF THE WARDS IN THE CHILDREN'S HOSPITAL, GREAT ORMOND STREET, LONDON

The children of the world have been saved much pain and suffering through Lord Lister's discoveries.

Lord Lister has all his days been a great gentleman of the finest type — simple, unaffected, modest. Foreign nations have heaped honours upon him. His own nation has given him the highest dignities that it can bestow. He was made, first a baronet, then a peer. The universities gave him their highest degrees; King Edward gave him the crowning distinction that a subject can receive, the Order of Merit. Noble statues record his work in foreign cities.

Yet none of these distinctions has altered the sweet simplicity of the great man's outlook upon life. He has never known pride as we understand it; he has merely been thankful that he has had the opportunity of rendering a service to humanity. A great surgeon who had performed a series of extraordinary operations once gave Lord Lister the details, and mentioned that he owed his splendid success in these operations entirely to Listerism.

Lord Lister looked carefully over the details. "Yes," he said, "that must gladden the heart of any man who loves his fellow-men." That beautifully expresses the way in which Lord Lister has always looked at his career. He was grieved at the time that his methods were so foolishly opposed, not because his own dignity suffered — he did not mind that — but because men and women and children were suffering.

But that age is past, and to-day, thanks to Lord Lister's untiring efforts, damage to brain and heart, or other vital organs, can be met and treated with the same hope of success as a fracture of a bone. London has an institute named after him. This is due to the generous and sympathetic efforts of Sir James Whitehead, who was Lord Mayor of London many years ago. When Lord Lister died, February 10, 1912, at the age of eighty-four, the world mourned, for the value of his services was finally realised.

THE MOTHER OF THOMAS À BECKET

THOMAS À BECKET plays such an important part in the history of England that no boy or girl who reads English history at all can help knowing something about him, and anyone who goes to Canterbury Cathedral will hear the story of his murder and see the stones of the steps to his shrine worn by the knees of Canterbury pilgrims.

There is a romantic story — really only a legend — about his father, Gilbert à Becket.

Gilbert was a Norman merchant who settled in London, so the story goes. He lived at the time when all brave men all over Western Europe were stirred up to go to Palestine and rescue the Holy Sepulchre from the Saracens, and it was only natural that he also should leave his merchandise, buckle on his armour, cross the water, and march with the Crusading army to overcome the infidel.

But, like many another Crusader, Gilbert à Becket was taken prisoner, put into chains, and cast into a dungeon, where it must have seemed to him that he would remain for the rest of his life, for unless one had rich and powerful friends there was not very much chance of getting released from prison once one had been captured and placed there, and escape was very difficult, owing to the careful way in which prisoners were guarded.

Yet he was not left there to pine and die, for a brave and beautiful Saracen girl loved him, and went to beg his life of the Saracen who had sent Gilbert to prison. She pleaded so hard for his release that she got her way, and, going to the prison, freed Gilbert from his chains.

When he got out of prison he returned to England. But the Saracen girl was very miserable without him, and though she knew only two words of his language — "London" and "Gilbert" — and had never before left her home and country, she determined to follow him to England.

Fortune favoured her, for by going down to the waterside, and repeating the word "London" to the mariners whom she saw there, she at last found a vessel sailing for that port; and she seemed in such trouble, and so anxious to get to London, that the captain agreed to take her there.

Arrived in London, she had a more difficult task, and one that nowadays would be impossible. But we must remember that London was quite a small place in the time of the Normans, and even now a native of Palestine in the streets of London, unable to speak English, and earnestly inquiring for "Gilbert," would soon attract a crowd.

Anyhow, the legend says that she found the Norman merchant, who was so touched by the faithful love of the poor girl, and the perils she had braved to find him, that he asked her to marry him; and, according to the legend, Thomas à Becket, the famous Archbishop of Canterbury, was their son.

A MAN WHO "NEVER WAS A BOY"

John Stuart Mill, one of the greatest of English thinkers, was the grandson of a shoemaker in Scotland and the son of a celebrated historian, James Mill, who educated his clever boy with great severity, so that he "never was a boy." At twenty he had a period of dangerous despair, from which he was saved, for himself and for all coming men, by reading the poetry of Wordsworth.

JOHN STUART MILL
as he sits in bronze in the gardens on the banks of the Thames in London

Mill himself wrote no poetry, and was as far removed from Wordsworth in the cast of his mind as two great and sincere men could be; but in a sense we owe the strong, stern, steely thinker to the poet, and to the poet's sister, Dorothy.

Mill lived a long and laborious life. He was employed in the office of the East India Company for thirty-three years, but his recreation was study and writing; and it would require all of his own many volumes to tell us what he thought. We can only pick out a few leading ideas.

He believed, with Bacon, that knowledge is power, and what is, perhaps, his greatest book — that on Logic — is devoted to studying the laws of logic, or reasoning, or arguing, so that, when men notice or collect facts, they may be able to come to right conclusions about them. A hundred men can collect facts, and describe them honestly and fully and correctly, for one who can see what they mean. Therefore, in all times, we need great thinkers to tell us how to reason. We have only to notice how politicians and doctors and other people differ as to the meaning of the same facts, in order to see how rare and difficult sound reasoning must be.

This is where the science of logic, or reasoning, comes in. Of all the men who have written upon it, since men began to think and write at all, two stand out as representatives of different sides. They are Aristotle, the great Greek, and John Stuart Mill, the Scotsman, of more than two thousand years later. Aristotle discovered and laid down for all time the laws of arguing down to particular cases from general truths, as men do in matters of religion and philosophy. Mill laid down the laws of arguing from particular facts so as to discover the general truths upon which they depend — which is the business of science. Aristotle is the master of argument from general to particular, and Mill master of argument from particular to general, though both thinkers wrote on both subjects. Mill's "Logic" is a difficult book to read, but it is a masterpiece.

If there is one subject more than another where men need logic to help them, it is the kind of subject that men argue about in politics — questions of government, and taxes, and budgets, and tariffs, and supply and demand. This subject is often called Political Economy, economy meaning "the law of the houses." Political Economy is therefore the law of the great house we call the State. Probably it is the most difficult subject in the world, just because it is so tremendously complicated. Perfectly honest people come to directly opposite conclusions from the same sets of facts in politics and political economy, as we can notice every day in Congress or in our legislatures.

These differences of opinion on political subjects have always existed, but perhaps the chief reason for them is not so much that they are difficult, as that men are not agreed as to what they should aim at. One man wants to make the world over at once. Another does not believe that men can be changed by laws.

THE MAN WHO HAD NO PREJUDICES

Now, John Stuart Mill was just the man for a case like this. Who but the author of the clearest book on reasoning ever written should write a book on Political Economy, where bad reasoning has always run riot? Mill did so, and his "Principles of Political Economy" is a very remarkable book.

But let no one suppose that mere logic, mere soundness in arguing, would enable any man to write a masterpiece on Political Economy. Mill's book is interesting, not merely because of its powers of pure reasoning, but because of its qualities of temper and of heart. The author takes no sides for or against his own class or creed, or any class or creed. He did not believe in government by kings and lords, but he no more believed in government by mobs. He had no prejudices. Think of that — a man who wrote on politics without prejudices! No wonder he was unhappy in Parliament, and left it.

WHY MILL WAS A GREAT MAN

And, lastly, Mill is the master of these subjects because he was for the good of all. One of the men whom his father had taught him to follow said that the object of government was the greatest happiness of the greatest number, and Mill never forgot the idea. So now we can begin to realise why his writings on political economy and on politics in general are so great: it is because they unite, in rare and noble degree, the three great sets of qualities — qualities of mind, qualities of temper, and qualities of heart.

About ten years after his great book on political economy, Mill published his famous "Essay on Liberty," in 1859, the year that saw Darwin's "Origin of Species," and in it he dealt with what is really the central question of all politics. This essay is agreed to be Mill's greatest work. It is short and easy to read, but it is filled with a nobility of thought and feeling and language which make it one of the greatest expressions of the human spirit.

Mill's essay declares that liberty is the condition of progress. He fears the tyranny of kings, and priests, and mobs, of the few and of the many alike. He reminds us that the mob, the people, the many, condemned Jesus and Socrates, just as single tyrants have condemned goodness and truth and love over and over again. "Only where there is liberty," says Mill, "can we hope for the utmost value from our great men." As Milton put it, Liberty is ever the nursery of great wits. And Mill and Milton both taught that progress is chiefly made by the few great men in all ages; therefore, if any nation is to be strong and happy, and to withstand the touch of Time, it must be a free nation, where the great men and women, the rare and priceless few upon whom all depends, can be heard and honoured, even though what they say is unpleasant to the few.

A GREAT BOOK WHICH CAN BE HAD FOR A FEW CENTS

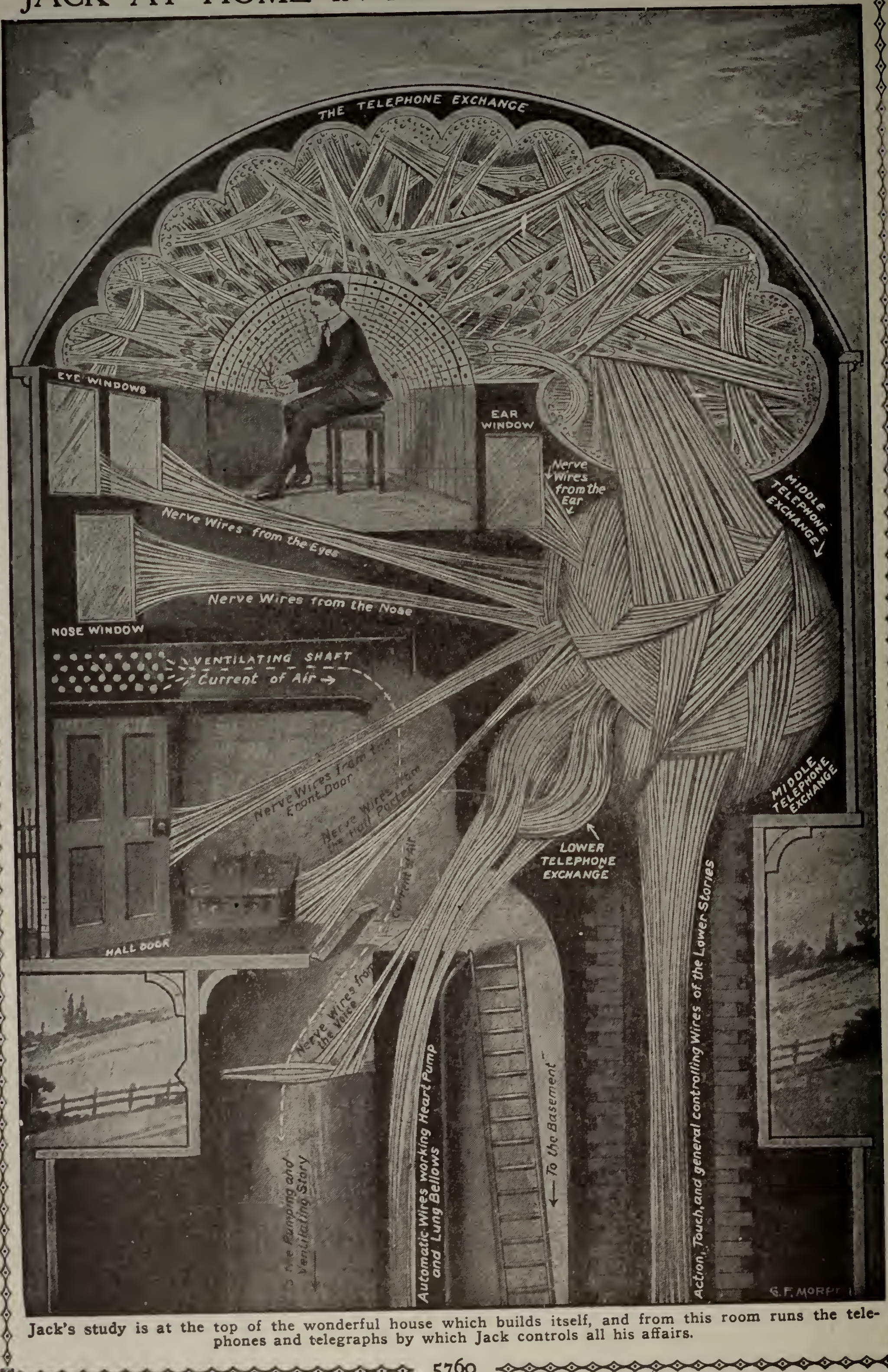
This noble essay of Mill's can now be bought for a few cents, and no one has a right to call himself educated, or to speak or write on these great matters, who has not read it. It is one of the imperishable glories of the greatest literature in the history of the world.

Many of the things that Mill asked for — especially justice to women, for which he pleaded nobly — have come or are coming. Men like Mill do not live in vain, nor do they die, indeed.

There were plenty to laugh at Mill in his lifetime — men and women, too. He soon left the House of Commons, which found him dull and tiresome. He is gone now, nor did he live to see the triumph of the ideas for which he lived and fought, but this champion of liberty was among those who can find comfort in the purity of his own motives.

CONTINUED ON PAGE 5795.

JACK AT HOME IN HIS WONDERFUL HOUSE


THE TELEPHONE EXCHANGE
EYE WINDOWS
EAR WINDOW
Nerve Wires from the Ear
MIDDLE TELEPHONE EXCHANGE
Nerve Wires from the Eyes
Nerve Wires from the Nose
NOSE WINDOW
VENTILATING SHAFT
Current of Air →
Nerve Wires from the Front Door
Nerve Wires from the Hall Porter
Current of Air
MIDDLE TELEPHONE EXCHANGE
LOWER TELEPHONE EXCHANGE
HALL DOOR
Nerve Wires from the Voice
To the Pumping and Ventilating Story
Automatic Wires working Heart Pump and Lung Bellows
← To the Basement
Action, Touch, and general controlling Wires of the Lower Stories
G. F. MORR

Jack's study is at the top of the wonderful house which builds itself, and from this room runs the telephones and telegraphs by which Jack controls all his affairs.

THE MOST MYSTERIOUS THING IN THE WORLD

WE have taken up in turn the different parts of the body and their functions. Now we shall glance at the body as a whole at work. This fanciful comparison may help us to understand better what we have already read. This house of Jack's, "a house not made with hands," is by far the most important and wonderful and complicated and mysterious thing in the whole world. It is the most important because the thinking part of men and women cannot exist at all in this world except in such houses; the most wonderful, because it daily does with ease a thousand things which cannot be done outside it; the most complicated, because the tiniest cell which goes to make it up is itself as complicated as a great city; and the most mysterious, because it is inhabited by Jack, grows from what cannot be seen at all, and can become the parent of other houses like it. So we must try to learn what this house is, what it does, and where it comes from.

(CONTINUED FROM PAGE 5284.)

THE HOUSE THAT JACK HAS

ALL except the simplest houses are built in stories, and so is Jack's. The house itself, commonly called Jack's trunk and head, simply consists of three stories, but it is placed upon two movable stilts, so that Jack can walk about, and he has two arms with which he can help himself to what he likes when he is walking about. These four limbs are very important, because Jack's house is always wearing away and needing new material to keep it up, and, as this material does not exist everywhere, Jack must be able to move about.

So our concern really is with the three stories that make Jack's house.

But before we study them we must look at its outer and inner walls. The outer wall is made of skin, which is found nowhere else — not inside the mouth or nose, for instance. This wall is remarkable in many ways. House-painting is never required, for the wall is ever renewing its surface from within, and all Jack requires to do is to wash away the dusty outside every day. As Jack's house is always moving,— for, waking or sleeping, he must breathe — its outer wall requires to be elastic. And so it is; nothing so perfect in the way of elasticity has ever been invented. But, indeed, Jack's house has hundreds of features which would make the fortune of anyone who could imitate them artificially. It is, of course, necessary that the walls of Jack's house should be water-tight. And so they are; they never let in the rain, and they may even be immersed in water altogether for as long as Jack likes, but not a drop of water will leak through.

But this is all the more remarkable because Jack uses the outer wall of his house not only as a wall and a waterproof, but also as part of his very perfect and complicated system of drainage. It need hardly be said that water has to be laid on to Jack's house, for, indeed, it consists of water to the extent of something like three-fourths of its whole substance. As in all good houses, there must be an efficient system of drainage for the water to escape by, and this is done in several ways, as the variety of uses for water in Jack's house is considerable. It is specially interesting that he should use his waterproof wall to let out a quantity of used water every day.

Also Jack uses his wall as a means of keeping his house equally warm by day or night in summer or in winter—which he manages to do so wonderfully that nobody can explain it. But somehow this wall lets out varying amounts of heat for his convenience. Lastly, all over this wall are stationed countless millions of sentinels, called the nerve-endings.

The inside walls mostly consist of bones, and, by an excellent arrangement, the walls of the rooms of Jack's house are jointed on each other, so that the house can change its shape, or even move about as a whole, whenever it pleases. This moving is done by Jack's hundreds of servants, who lie along the walls, holding one wall with one hand and one with the other, and pulling them backwards and forwards as Jack desires. Jack believes in economy, however, and he has a remarkable arrangement by which he employs all these servants of his as fireplaces.

In somewhat the same way Jack is not content to use his inner walls merely as walls, for they are all hollow, and inside them, all the time, are being made millions of millions of tiny porters and policemen, called the red and white cells of the blood.

THE BUSY WORKERS IN THE BASEMENT OF JACK'S HOUSE

And now we can begin to study the three floors of which Jack's house consists. They are the basement, the middle story, and the top story, or watch-tower; these are commonly called the abdomen, the chest, and the head. A dog or a horse has a wonderful house, which is very like Jack's in many ways, but these animals have their three stories one in front of the other instead of one above the other. Jack's house is built in what is called the "erect attitude," and this enables him to use the top story, or head, as a watch-tower, far better than any of the animals can do.

The basement of Jack's house is, as we should expect, the least attractive story, but it is the largest, and Jack's house could by no means do without it. Its chief concern is with the receiving and storage, and breaking up and sending away to be burned, of the fuel, or food, with which Jack's house is kept warm, and here its various engines and pumps are run. This is a business which cannot take a holiday, for though Jack's pumps and engines are commonly run at something like half-speed during the night, they are never allowed to stop at all so long as Jack remains in his house, and if they did the house would at once begin to crumble. So we can understand at once that the whole business of taking in coal, or fuel, and dealing with it, is very important. Jack cannot store very much fuel at any one time, but he can always have a supply of one kind, called fat, on the premises, and one of the favourite places for keeping it is just inside the front wall of the basement.

HOW FRESH AIR IS DRIVEN THROUGH THE HOUSE

The middle story of Jack's house consists, above all, of the arrangements for ventilation. Ordinary houses may or may not be ventilated, and very few of them are specially built with this consideration in view; but if Jack's house were not ventilated it would fall to pieces and be uninhabitable, and thus we find that its middle story is practically filled with the two lungs, which take the fresh air in and give the spoiled air out, and with the great central pump, or heart, which drives the fresh air through the house by means of a system of tubes called blood-vessels, which go everywhere. The lungs are really bellows, and the heart, as we have said, is a pump. The essence of bellows is that they are expanded by some means and then air rushes into them. The bellows of Jack's house are expanded by the muscles, or servants, lying against and holding on to the walls called ribs, and thus enlarging this part of Jack's house every time he breathes. The central pump, or heart, is a true pump, or combination of pumps, fitted with four perfect valves.

WAITERS, ELEVATORS AND WATCHMEN

The blood is so marvellous a thing that we can compare it with nothing else in the world. It is a complete ventilating system, carrying fresh air in and foul air out; a complete water-supply; a complete service of waiters and elevators, carrying food to all parts of the house; a complete drainage system, carrying rubbish and litter away from the various rooms; a day and night patrol of watchmen on the look-out for burglars, such as the microbes of consumption, which are apt to make an entry through the ventilating shafts, or sometimes by the front door; and a chemist's shop, containing large numbers of antidotes to most of the common poisons.

THE BUSY SENTINELS ON THE TOP STORY

Lastly, there is Jack's top story, where he himself lives. As this is the master's apartment, situated above the others, very perfect arrangements have, of course, to be made for sending everything necessary up to it, and if we put our fingers on either side of Jack's neck we can feel the two great arteries that are always sending food and water and air and so forth up to Jack. At night Jack finds that the best way of resting all his many servants — though they never rest entirely — is to lay his house down on its side, or on its back, though that is not so good.

The top story is supplied with various windows and sentinels,, especially the eyes, which, being much farther sighted than the sentinels in the skin, are naturally placed in the watch-tower. Other kinds of sentinels are the ears, the nose — which is also an elaborate filter for the ventilating shaft — and the tongue, or hall porter, who closely examines everything which is admitted to the house by the front door.

JACK'S TELEPHONE

Each sentinel, like those found everywhere in the outer wall of the house, has a perfect telephone connection with Jack's study, so that orders can instantly be given in accordance with what they report.

Jack himself lives in the study, which is in the top part of his brain — where the telephone exchange is — and he is to be found behind the various windows and sentinels. His brain is itself the topmost part, or level, of what is called his nervous system, which is essentially an arrangement of electric bells or batteries, speaking-tubes, telegraph and telephone wires. This contrivance goes everywhere, but it is interesting to know that, like Jack's house itself, it is made of three levels, or, we may say, has three exchanges, one above the other.

The top part of the brain is the highest exchange and is master of the other two, and there Jack lives. But the other two are very important, and the lowest, though the others are masters of it to some extent, is yet entirely responsible for the most important services of Jack's house, and will not obey even Jack himself for more than a moment. This lowest exchange is also the oldest in the history of Jack's house, and is the least easily upset if any enemies get into the house — such as microbes, or alcohol, or the poisons produced by hard work. The lowest exchange controls the bellows and pump in Jack's middle story, and its importance is due to the fact that without their ceaseless action Jack's house would be no longer habitable. If this exchange, found in a tiny place called the "bulb," be destroyed by any accident, the ventilation of Jack's house instantly ceases, the whole structure of the house collapses, and Jack, as doctors would say, "dies of asphyxia."

THE GREAT RECORD OFFICE OF JACK'S HOUSE

The middle exchange, or level, of Jack's nervous system lies at the base of the brain, and is principally concerned with receiving messages of all kinds from the sentries in the skin, and from the great sentinels stationed in the top story. These messages do not arrive in any complete form, but only in fragments, for each sentinel can report only what he notices. It is the business of the middle exchange to piece together all the tiny scraps of information sent in to it piecemeal, so as to make sense of them.

The exchange can only do this by the aid of past messages, and thus the middle exchange is a great record office, not merely receiving and piecing together the messages always coming in, but comparing them with its records;

and then, when they have been collected, corrected, and interpreted, it sends them up by its own wires, or nerves, to the top exchange.

Jack's study, of which the proper name is the neo-pallium, or new mantle, is a grey fold of brain spread out over the top of the whole, and it is quite new in the history of living beings, or, at any rate, it is not known in the earliest creatures, and is as new in the world as mankind is. It is worthy of Jack, and is, indeed, by far the most wonderful part of his wonderful house. It contains many millions of nerve-cells, which are a kind of combination of electric batteries and pigeon-holes. From and to each of them there run nerves, or wires, and between all these, and between them and the lower exchanges, these wires also run.

HOW THE WONDERFUL HOUSE THAT JACK HAS REBUILDS ITSELF

But now we must realise that the architecture of Jack's house, though there can be no end to the study of it, is no more than a guide to what this incomparable house does. Every moment it is wasting away; indeed, unless it does so it is of no use. Thus, if it is to stand, it must repair itself, and this it does by daily building up into its substance certain parts of Jack's food, while the rest is burnt as fuel for the heating apparatus and for the machinery that moves the walls. Nothing made by mankind has this power, which is displayed by living things and is the mark of their life.

It is especially noteworthy that Jack keeps a large number of chemists constantly at work in his house, turning the raw material, admitted by the hall-porter, into the special kinds of stuff of which Jack's house is made. These chemists far surpass any chemists that are known elsewhere. They can build up complicated materials from very simple ones, and this they do without noise or explosions or great heat or waste. It is also very noteworthy that the furnaces, or muscles, can burn their fuel, such as sugar, at the temperature of Jack's house, though no sugar will burn at anything like that temperature outside such houses as Jack's.

THE MARVELLOUS MACHINES WHICH NO MAN CAN MAKE

Furthermore, there are no machines so clever as Jack's muscles anywhere else. The great business of an engineer is to get a machine which will turn as much as possible of the fuel it consumes into useful work. If a machine can turn ten or fifteen per cent. of its fuel into useful work it is called highly efficient and economical. The rest is waste. But Jack's muscles not only turn a higher proportion of their fuel into power than any machine made by man can, they also turn the whole of the rest of the fuel into heat to keep Jack's house warm. There is thus no waste at all; and these machines therefore beat all others, not to mention the trifling fact that they repair themselves from moment to moment — as if one could send a stream of steel through a motor-car by which it made good its wear and tear as it went along the road!

But the least has yet been told. Jack was once a baby, and his house was a baby's house. Yet it grew into Jack's house, and it is growing still. Now, it is wonderful enough to have a house that can maintain itself in repair, but what about a cottage that can grow into a mansion? The truth is that there is nothing to be found in fairy tales which equals Jack's house. It is a magic house, surpassing all knowledge and all imagination, not only in the marvellous intricacy of its architecture and the unique character of its materials, not only in its extraordinary powers of feeling and doing and thinking, but also in its amazing history.

THE HOLY HOUSE IN WHICH GOD LIVES

We have not yet considered the most solemn thing of all, that Jack's house is also the House of God. St. Paul said, "What! Know ye not that your body is the temple of the Holy Ghost?"

Jack's house is therefore a holy place, to be cared for, kept clean and pure, and held in honour because of Him who dwells therein. Those who remember this solemn truth treat their bodies with careful respect, avoid habits which injure them or do them dishonour, and seek to protect the bodies of others.

THE NEXT STORY OF JACK'S HOUSE IS ON PAGE 5910.

Twenty-five hundred cattle going to a farm in Queensland. Not one animal went astray.

CONTINUED FROM PAGE 5721

LIFE IN AUSTRALIA TO-DAY

AUSTRALIA has, happily, never known the miseries of armed conquest, but it has been won for civilisation by brave deeds and feats of endurance as inspiring as any that have been performed on the battlefield. Hardy pioneers had to explore waterless lands, or to hew their way into great forests, and they often gave up their lives while opening a way for others to follow.

The pioneers did their work well, and flocks and herds now graze where explorers perished from thirst and starvation not many years ago. The forests have been conquered, and have made way for the farmsteads; the wheatfields wave and the orchards are heavy with fruit where the kangaroos and wild dogs roamed; and children walk to school along well-made roads which were once rough tracks, cut through the bush by their fathers when they came with all their goods in a bullock-wagon.

Here is the story of how one of the most desolate parts of Australia was turned from a wilderness into a wheatfield. In the north of Victoria there is a great tract of country, more than half the size of Scotland, which had long been regarded as useless. It was covered with a dense scrub, called by the native name, the "mallee," and the land thus came to be known as the "Mallee Country." The mallee grows from about fifteen to forty feet high, a cluster of stems coming up from a crown at the surface of the ground, each stem being about nine inches or a foot in thickness. For many years this country was left to desolation. No rivers water it, very little rain falls over it. No grass grew there, and it seemed condemned to be for ever a waste.

There was lying at a railway station on the fringe of the Mallee a great iron boiler, weighing several tons, for which the owner had no further use. A man saw it, and a thought flashed through his brain. It did not pay to "grub up" the mallee scrub, but might he not roll it down? To think it was to try it. He turned the boiler into a roller, hitched a number of bullocks to it, and set off for the Mallee.

We can imagine how the mighty beasts strained on the yokes, how the driver shouted, how the whip cracked like pistol-shots in the air. The force was irresistible; the trees bent, and as the huge roller ran up the stems these crashed down, breaking off at the crown. The brain of man had triumphed; the conquest of the mallee had begun. Next, fire was called to aid, and the scrub which had been left in the hot summer sun disappeared in a tornado of flames.

So the pioneers learned how to get rid of the scrub. But the stumps remained, and how could the land be ploughed? Then into the brain of another man came another great idea.

Why not make a plough that would run on wheels, so fashioned that if the "knife" should strike a stump it would swing back, pass over, and fall back into the ground again. Again to think was to act, and there came to be made what is now known throughout Australia as the "stump jump plough," to be followed by the "stump jump harrow and cultivator."

The farmers were now able to plough the land and sow the wheat at a very low cost, but so small was the yield that it did not pay to harvest it in the usual way by cutting with a reaper and binder, and then threshing it. Many of the pioneers were ruined, and they abandoned their holdings. The scrub grew up again, and it seemed as if, after all, the mallee would conquer in the end. But to the brain of another man came yet another idea, and he invented the combined harvester.

As soon as the grain is well ripe, this wonderful machine is brought into the field, drawn by three or four horses. When it has done its work one would think that nothing much had happened, except that some of the stalks had been bent and some trampled down. But on a closer view it would be found that the machine had stripped off all the heads of grain. On the front of the harvester is a bar with fingers along it, pointing forward, and as the machine is pulled through the crop these fingers comb off the heads of the wheat from the stalks. The heads pass into a big drum of iron, where the grain is threshed and the chaff winnowed out. The grain then runs into sacks, which are sewn up as they are filled, and then dropped.

CROSSING A RIVER IN NEW SOUTH WALES

In this manner the mallee has been conquered. It did not pay to grow wheat when it cost at least $25 an acre to grub up the scrub, but now, with the mallee roller, the stump jump plough, harrow and cultivator, the mallee can be rolled down, burnt off, cultivated, and sown with wheat at a cost of about two dollars and a half an acre, and after the first year the cost, of course, is much less. Then comes the complete harvester, and, at a cost of a few cents an acre for labour, puts the wheat in bags ready for market. Therefore the Mallee farmer makes six bushels an acre pay.

And now the Mallee Country, which was once a desolation, is the chief wheat-growing area of Victoria, with prosperous homesteads sheltering the true empire-builders.

That is a story of Victoria, one of the six great states which make up the Commonwealth of Australia. Here is a letter written from the same state to one of the editors, by the mother of a happy family of boys and girls.

The letter describes the life of an Australian homestead in November. Though this is an autumn month with us, we must remember that south of the equator the seasons are just the opposite of ours.

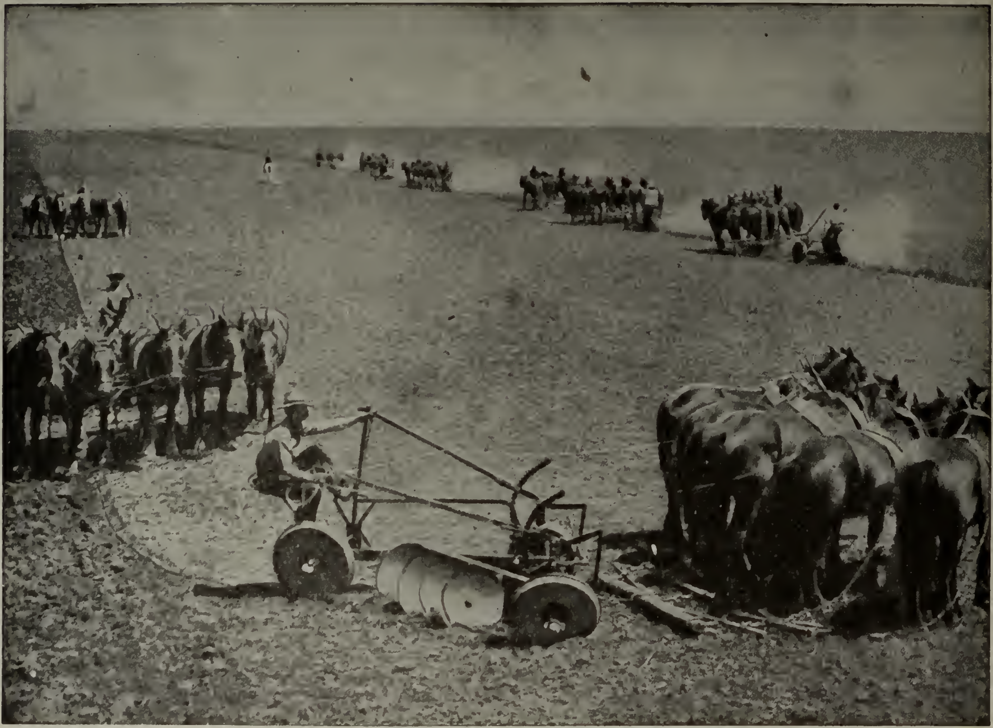
We have to shut up our turkeys, ducks, geese, and fowls (says the writer) because of the foxes, which are very numerous about here. They are English foxes, but very much at home in Australia now. The trappers near here catch an average of one a week, and as the skins are at present worth from 5s. to 10s. each, they are worth catching. The trappers are at present trapping rabbits.

This country swarms with them, and among the browny-grey ones are black, white, and bright yellow ones. At sundown the hillsides become alive with the pretty little creatures, hopping about through the bracken with their cotton tails bobbing behind them. The traps are cruel things, with their iron jaws; and the poor little rabbits make a pitiful, tremulous squeal when they are caught. The skins are stretched on wires and dried, and then packed in bundles to sell at 1s. 6d. per pound — about six skins to the pound. Our pet cats have been caught more than once in the traps.

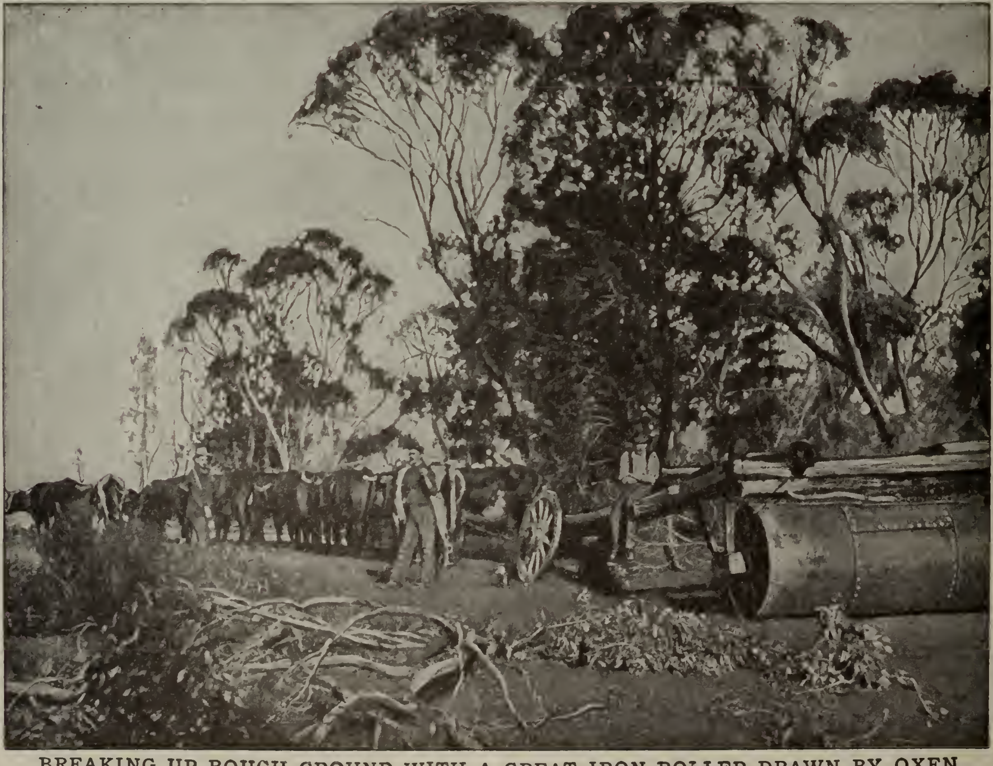
THE BEAUTIFUL COUNTRY AND THE FINE ANIMAL LIFE OF NEW SOUTH WALES

Sometimes other creatures are caught — a crow, who flew off with one leg hanging when he was freed; small birds or bush rats; and sometimes even an eagle-hawk, but as that bird is very large and strong he flies off with the trap hanging to his leg. The bodies of the rabbits are mostly wasted; animals and fowls are fed with some of

HOW THE MALLEE COUNTRY WAS CONQUERED



PLOUGHING A HUGE FIELD IN NEW SOUTH WALES WITH SPECIAL DISC PLOUGHS



BREAKING UP ROUGH GROUND WITH A GREAT IRON ROLLER DRAWN BY OXEN

GATHERING THE GREAT HARVEST IN AUSTRALIA

CARTING WHEAT ON A BIG FARM IN NEW SOUTH WALES

REAPING TIME IN A WHEATFIELD IN TASMANIA them, but the country people, as a rule, will not eat rabbit. It is really wonderful how the rabbits have increased since they were imported from England, and what a number of industries have been called into existence in consequence.

THE RABBITS THAT NO BOY IN AUSTRALIA MAY KEEP

Anyone may kill them, but no one may keep a rabbit. There is a penalty of £10 for this offence, and the rabbit would be killed. A rabbit inspector lives not far away, and drives round viewing the country — seeing that the land is poisoned once a year and that traps are kept going all the rest of the time. But the rabbits increase.

The rainfall is pretty good here, and, owing to the nature of the soil, the water lies near the surface. The hills remind us of huge sponges at this time of the year; every footmark on them fills with water, and the ground pulls our heels. There is no real winter; the grass is always growing, the native trees, gums, blackwoods, wattles, wild cherries, and honeysuckle, never shed their leaves, and the scrub is green all the winter. In the garden now are daffodils, jonquils, violets, and all English spring flowers. In the paddocks the wattle-trees are covered over with tiny golden balls.

One of our Australian poets writes of "golden-haired September," for not only the wattle-trees, but the blackwoods and the honeysuckle will be a mass of yellow bloom, and innumerable small yellow flowers cover the paddocks in that month.

THE PLANTS IN THE WOODS AND THE BIRDS IN THE AIR

We have two South African plants very much at home here, which add their yellow flowers to the golden scene. They are the Cape broom and the Cape daisy, the latter beloved of sheep, pigs, and cows. The ever-noisy creeks are bordered with ferns, and there is plenty of maidenhair all about.

Kangaroos, both the large "foresters" and the smaller "brush," as well as emus, are still plentiful, but not in sight of the house, though "jackasses" still peal with laughter night and morning. They are large kingfishers, but the bright little kingfishers at the creeks are silent. The magpies are very noisy on moonlight nights as well as in the daytime, and the bushes and trees are full of native and English birds. Bright red, blue, and green parrots are bold and impudent, flying about close to the house, and stealing fruit later in the season. Four huge eagle-hawks circle round, crying "Woger, woger!" and casting black shadows as they fly between us and the sun. They live mostly on rabbits, but are fond of ducks, and will steal young lambs. Swamp-hawks are not so large, and kites are still smaller.

Then there are the very pretty speckled sparrow-hawks, with their gentle, decoying, dove-like note; they are the smallest birds of prey. Night-hawks and owls, and the "mopoke," or frog-mouthed owl, are rarely seen but often heard at night. This bird utters its mournful cry, "Mo poke, mo poke!" persistently for hours at a time on a frosty moonlight night. English thrushes, sparrows, and swallows stay about the house, and an English lark was lately heard singing not far away.

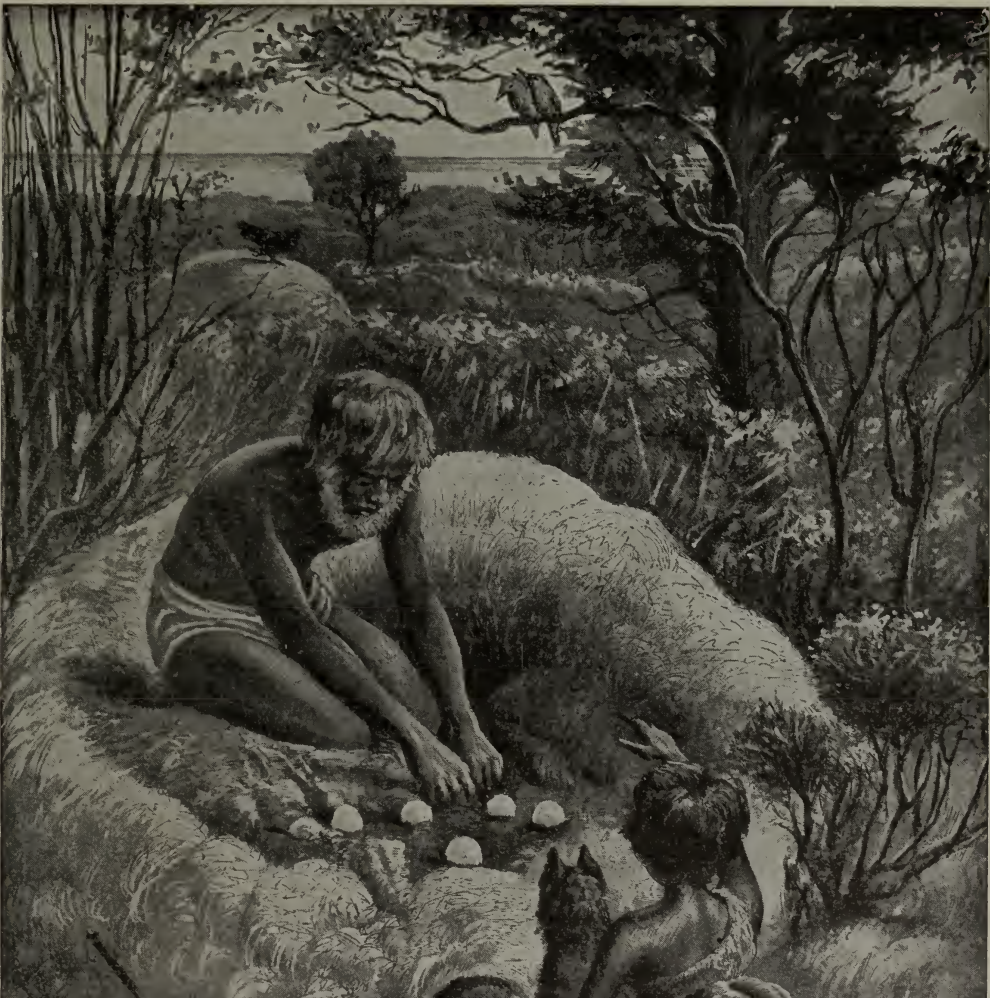
THE JACKASS THAT CAUGHT UP A SNAKE IN HIS BEAK

The native birds are very noisy; they all talk, twitter, laugh, *choke,* or whistle, but, except for the liquid notes of the magpie, one cannot say that Australian birds sing. One day I saw a jackass fly up with a snake hanging from his beak! I cannot tell where all the snakes hide during the winter, one never sees them; but they reappear in the summer. We are always afraid of them, for they are poisonous.

There is as much wood as we choose to burn here, for the land needs clearing. We use the rain-water from the roof. We do all our own work, and make our bread and butter, salt our meat, and a few years ago I made soap and candles as well.

Our food costs us on an average 2s. per week per head, which sounds ridiculous, but I can assure you that that is all it has cost us for sixteen years. We paid 4s. for a sheep for eating, and £2 4s. for a pig, killed and cleaned — that was threepence per pound.

A MAN SITTING IN A BIRD'S NEST



AUSTRALIAN NATIVE DIGGING EGGS OUT OF ENORMOUS NEST OF THE BRUSH TURKEY

All the farms grow oats, potatoes, and occasionally other crops, and all have cows and cream separators. At one small farm, with only four cows in milk, they are setting the cream at present, and making 33 pounds of butter, which they are selling at 10d. per pound, but this is rather better than most. This is the end of the worst season for cows; they will improve as the spring grass grows, and then the separators will be in full swing again. Influenza comes even here — but where does it not? We have never had a doctor so far. We have had occasional illnesses during the twelve years we have lived in the district, but we have recovered without the doctor, as he lives at Portland, thirty-four miles away, and we could not get him here in a hurry.

A MELBOURNE READER
in a playhouse built by her father

The children like the free life, and the native birds and animals interest them greatly. I forgot to mention native bears and opossums among them, but as they are dormant during the daytime we see very little of them.

THE SUMMER BEGINS IN NOVEMBER

We are having very hot weather, while you are probably finding it difficult to keep warm — for it is November. The gardens are full of summer flowers, the gooseberries are ripening on the bushes, and the shearing is in full swing. Mary came home from school the other day carrying a stick, from the end of which hung a long brown snake, which she told us she had killed on her way.

For eight months in the year we are tormented by the fear of snakes; from September until the end of April they are active, and they are usually dormant from the beginning of May to the end of August. The tiny sand-flies have been tormenting us to-day, and the March flies are just appearing. There is an infinite variety of insect life. Many are great pests, of course, but many are very interesting. A very large crimson caterpillar was brought home by Roger the other day, but as he was not sure of its special diet, and it did not care for the leaves he provided, it quietly made its escape in the night. The clear places on the creek flats are covered by little mud towers, the work of "gabbies," a small crayfish. The hills, or towers, are usually called "crab-holes," and are rather dangerous to ride over, as the rider may get a very awkward fall. The young rabbits are enjoying the luxuriant grass, and a large black and white cat has taken up its abode in the bush, having grown as strong and big as a rather large fox terrier. The house cats bring in rabbits as big as themselves, carrying their dead bodies by the back of the neck.

The air around the house is filled during the daytime with a great variety of birds, from the huge eagle-hawk to the little tit. The parrots are the most brilliant in their colouring. The purple-capped lory is the brightest of all these gay little creatures; but the rosellas, grass-parrots, blue mountains, and parraquets are all at their very brightest now.

Black cockatoos, with sulphur crests, as well as the white, with either sulphur or pink crests, are not so numerous as the parrots, but their screech is much louder. I wish I could clearly represent to you the vast number of birds of all kinds that we daily see and hear.

THE ASTONISHING SCENERY OF AUSTRALIA

THE AUSTRALIAN BUSH, OR FOREST, IN THE CAPE OTWAY MOUNTAINS, VICTORIA

TROPICAL APPEARANCE OF THE BUSH IN THE DANDENONG MOUNTAINS, VICTORIA

THE LITTLE BROWN CHILDREN

Many of the loveliest little children in the world dwell in the romantic islands of the South Seas which make up the archipelago known by the name of Samoa. The group was discovered in 1768 by a famous Frenchman, Captain Bougainville, who called it the Navigator Islands; but the native name has been adopted by geographers. The name Samoa comes from two words, "Sa," meaning sacred, and "Moa," meaning hen, for an old heathen myth relates that these delightful islands were the eggs laid by a monster bird.

There are ten inhabited islands in this cluster. The principal are Savaii, Upolu, Manua, Ofu, Amnono, and Apolima. All are surrounded by wonderful coral reefs, and all are mountainous, splendidly wooded, and unspeakably picturesque. The most important, though not the largest, is Upolu. Five of the islands, lying westward, belong to Germany; the five eastward isles are under the American Stars and Stripes. Apia, the capital of all Samoa, is on Upolu. It is of special interest to all of us, because at Vailima, only three miles distant, lived for the last years of his life Robert Louis Stevenson, so dearly loved by boys and girls as the author of "Treasure Island." His grave and monument are under the palm-trees at Vailima, his home.

A YOUNG SAMOAN PRINCESS

THREE GIRLS OF SAMOA

The little brown children of Samoa from their earliest years revel in the loveliness of their earthly paradise. They are reared in scenes of the most perfect enchantment, and they are themselves as fascinating as the flowers round their homes.

Their fathers and mothers are often exceedingly handsome; the Samoan women, indeed, are famous for their grace. The people live very much by fishing all round their coral-belted coasts, and by growing immense numbers of cocoanuts and large quantities of bread-fruit; of bananas, of yams, and of coffee. Everything grows so very easily that the Samoans need to do but little hard work, and the boys and girls little hard work. They do not like to serve foreigners, and so they have been mistakenly called lazy. What they prefer is to gain their own livelihood on their plantations.

Now you will be able to understand why the young Samoans can find plenty of time for all kinds of delightful play and sport. They all go to the village schools, established years ago by British missionaries of whom the first was the famous and heroic John Williams, afterwards martyred by cannibals at the island of Erromanga. The seeds of Christian civilisation were soon planted. Such seed was needed, indeed, for nobody else had ventured to land on any Samoan shore since, years before, Captain Cook sent a boat to Tutuila for water for his ship. The eleven men in the boat were all killed by the savage Samoans, who clubbed them to death. I mention these facts to show that the Samoans were not always the gentle and harmless folk that they are to-day. Formerly their boys were taught to fight and slay. The Roman Catholic missions and schools are also flourishing and have accomplished a great deal.

VILLAGE CHILDREN

Such work as the little "brownies" of Samoa do they learn very early. In the villages little maidens of eight or nine may be seen up to their waists in a hole, doing the family washing. But you must remember that in these islands it is not a heavy task, for the clothing needed in the South Seas climate of perpetual summer consists of little more than a skirt reaching from the breast to the knee. The children are very useful in fetching water, which they bring from the crystal springs in large cocoanut-shells, carrying six at a time filled with water. The shells thus used as natural waterpots are placed in a Samoan basket, which is plaited out of the large green leaves of the cocoanut palm. The cocoanut-shell bottles are manufactured in an ingenious manner. A little hole is cut in the top the size of a dime, then the inside is filled with sharp little pebbles and the cocoanut is shaken till the white flesh within is worn away. When the nutshell is quite empty, the bottle thus made is stopped with a cork made of banana leaves.

SAMOAN GIRLS PREPARING FOOD

The boys and girls of Samoa love to decorate themselves, as do their elders, with the glorious flowers of their land. They always on feast days wear belts of flowers, necklets of flowers, and head-dresses of flowers, and thus add the greatest loveliness that Nature can show to their own personal charms. A party of young Samoans in their holiday costume, consisting much more of flowers than of clothing, is a most fascinating sight. The girls take great delight in elaborately arranging their hair, in which they place tortoise-shell combs in fantastic positions. Plenty of cocoanut oil is plastered on their dark tresses.

The favourite playgrounds of the young Samoans are the seashore, the coral reefs, and the sea itself. These youngsters are the most wonderful juvenile swimmers in the world. Both boys and girls are never so happy as when they are surf-swimming. Now, surf-swimming at Tutuila and Upolu and Savaii is a very dangerous-looking game; and, indeed, it is only by careful and gradual practice that these children become expert, as they nearly all do. They first learn to swim quietly when they are little more than babies. By degrees they practise the art of swimming on little boards, with which they wait for great waves to come up and carry them furiously right up high on the beach. When the ebb tides are very low there are other happy times for the little brown folk. They then wade about on the coral reefs, which are nearly bare, and search for loose lumps of coral, for little fishes and crabs.

A MIDDAY REST

One of the early ambitions of a Samoan boy is to manage a canoe, and he is allowed to do this before he is very big. He paddles about awhile, then leaps into the ocean and swims, then hoists himself up into the canoe to paddle about again. The wonderful thing to visitors among the islands is that these island youngsters can swim long distances under the water, and seem to be as much at home under as above the surface of the sea.

A daily scene in Samoan villages is the procession of children going to school. Each child starts at six in the morning from the home on the plantation, carrying a Bible, the only reading book, in a white handkerchief, and also a little slate. The work of the day begins early with them. All the later hours with the children are for play. The children are very musical, and possess many mouth-organs and Jews'-harps, out of which they manage to get far more music than could be imagined.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 5801

THE HOME OF A WEALTHY SAMOAN FAMILY

Two peeps into a sparrowhawk's nest, showing the eggs and the young birds hatched from them

THE HOMES OF THE BIRDS

THE CLEVEREST BUILDERS IN THE WORLD

CONTINUED FROM PAGE 5730.

NOTHING pleases a business man more than to be able to put up on his signboard the announcement, "Established 100 years." It shows that his business must have been well conducted, and that the firm is a respectable one, or it would not have lasted so long. Well, there is a little colony of blue-tits, or tomtits, on a tree near Stockton-on-Tees, which, if they had printed announcements, would be able to put on their sign, "Established over a century." For a hundred years this family of blue-tits has nested, generation after generation, upon that very tree, until its members ought to be included among the aristocratic families.

Such a period must represent from fifteen to twenty or more generations of blue-tits, a very long record indeed. The same number of generations in our own families would carry us back some six hundred years, and there is not a single person in the United States who can say that his family has been in the same home for that length of time. The long tenancy of these little blue-tits reminds us that, where the conditions are favourable, where people are kind and do not interfere, where the food supply is liberal, the birds go on building and rearing their young.

The fact that the birds live in the same kind of nests for so long might, at first sight, seem to contradict the idea that all Nature is progressing, that all members of the animal family make their conditions of life fit the conditions in which they have to live.

But where altered circumstances demand new methods, the birds are never lacking in cleverness, never unable to adapt themselves to the new conditions. When birds prosper in the old way, we may know that there is no cause for them to change their methods. They have passed the experimental stage. Thousands of years have gone to the making of the commonest of ordinary bird-nest that we see. It has taken all that time for each species of bird gradually to master the secret of building.

The bird's nest, in its highest form, is the most perfect cradle ever made, so naturally we think of it being, as a rule, soft and downy, warm and snug. Of course, it is not so always. The birds which frequent the sea-shore and the rivers content themselves, very often, with a rough hollow, either in the ground or in a cleft of the rocks, or upon a ledge of some dizzy cliff. Birds of prey, too, are often rough and ready in their methods. The eagle's nest is a clumsy structure of sticks.

The heron likes to have her nest high and dry in some lofty tree-top, and lines it with roots and twigs and soft grass. Not many years ago a nest was blown down from a heronry in Stoke Park, Nottinghamshire, and an observer, on picking it up, was startled to find that it was made up almost entirely of wire, such as is used by some reaping machines to bind sheaves. The finder of the nest got a telescope, and carefully examined the other nests in the heronry, and found that others had been built in the same way from materials which the birds had gathered.

HOW THE BIRDS HIDE THEMSELVES

A moor-hen has been known to build a home of much the same kind, but as a rule she builds of sedge, reed-flags, and dead leaves, and makes it a masterpiece of safety. The nest is placed by the side of a river, stream, or lake, among reeds, in the roots of a tree overhanging the water, or even among the branches of the tree which stretch out low across the water.

The writer of this story sat one day in a boat and saw a nesting moorhen hide by deliberately sinking herself in the water, so that only the red bony plate of her forehead was visible, looking like a tiny crimson leaf floating on the stream, only six feet from the boat. We rowed away gently, pretending not to have seen through her marvellously clever deception.

The heron is not the only builder of strange nests. Wild pigeons, the blue rocks from which all our pigeons are descended, use whatever lies ready to their beaks. One of their nests was found a few years ago on the roof of the Crystal Palace, consisting mainly of hairpins and pieces of wire, gathered in the grounds.

TWO BIRDS THAT WENT TO A WEDDING

We can all quickly recognise the nest of a chaffinch, a neat, comfortable little structure, snugly perched in a garden tree, and built of mosses and pieces of wool, delightfully lined with horsehair and feathers. But one pair of chaffinches went to a wedding, after the other guests had gone home, and, gathering up the confetti, built that, piece by piece, into their own little dwelling. Still more curious was the fancy of a pair of spotted flycatchers, which had used a great quantity of wax matches, bound together with pieces of silk and cotton. They had not scorned to pick up a couple of cigarette-ends, and work these into the sides of the nest. The presence of so many old matches in the composition of the nest suggests that the birds must have deliberately sought them out after the first find.

All these birds show a spirit of progress. They prove that when, from choice or need, fresh material, unlike any ever used by their species before, has to be considered, they can build with the new stuff as well as with the natural products with which, during age upon age, their ancestors have been accustomed to work.

The thrush and the blackbird make every garden merry with their jolly song, provided there is a worm, a snail, or a slug to be found. They do not flee from the habitations of man; they come to us.

INSIDE A BLACKBIRD'S NEST

They build in our garden bushes and trees, in our ivy, in our hedges, nests which are so common that the excellence of their make escapes notice. The outside of a blackbird's nest, though only made of coarse grass and other rough material, is admirably woven, but the beautifully arched interior of hardened mud, with its lining of fine grass, is really a splendid piece of work. It seems quite tiny when we look inside, but in it from four to six gaping, gawky youngsters live and grow into their first suit of feathers. The old lady who lived in a shoe could never have had a blackbird for schoolmistress, or she would not have found her children too many for the shoe in which she grumblingly lived. The thrush, which floods the air with such wonderful melody morning and evening, and whenever a welcome shower comes to refresh the earth, is another skilful builder which turns clay into a nest-interior as sound as the inside of a cocoanut-shell.

We all have our favourite birds, but there are half a dozen which most of us would agree to place at the head of our

A COOT GOING TO ITS NEST ALONG A PATH IT HAS MADE IN THE WATER

list, and the nightingale would surely come first with us all. There is such majesty in the melody of this bird that somehow we cannot but regard the nightingale as royal in all that affects it. It ought to live in a sort of bird's palace, we fancy. But fact and fancy do not here agree. The nightingale makes one of the poorest of nests, dead leaves huddled together and lined with grass being the home in which this miraculous songster brings up its little ones. Our great men and women are not always born in the mansions of the wealthy, and therefore we need not be disappointed that our finest singer is quite humbly cradled.

A REED-WARBLER'S NEST

We all agree, again, as to the charm of the skylark; its inspiring song, heard high in the heavens over our heads, and its blameless life, make it a universal favourite. But here, too, we have a surprise in regard to the nest. This high-soaring bird seeks the lowest level for the cradle of its little ones, making a nest of grass on the ground, with only a tuft of turf or a clod of earth for protection.

Another prime favourite is the robin, with his friendliness for man, his brilliant eyes, his handsome breast, and, above all, that sweet trilling song of his which cheers and gladdens us when most other birds are moping. He is with us

A GREAT CRESTED GREBE ON ITS NEST, BUILT ON THE WATER

WONDERFUL HOMES OF THE WEAVER BIRDS

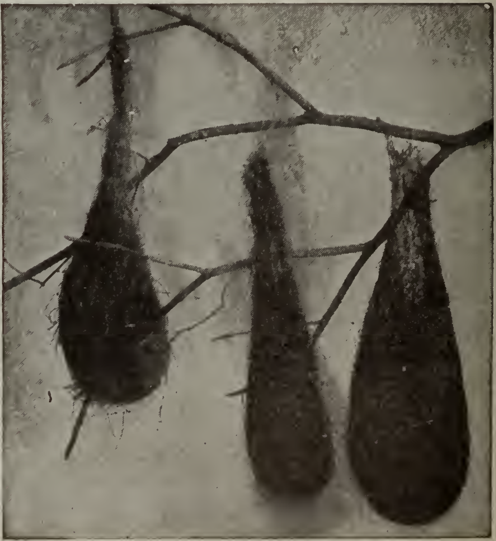
A weaver-bird's nest

Villages of sociable weavers

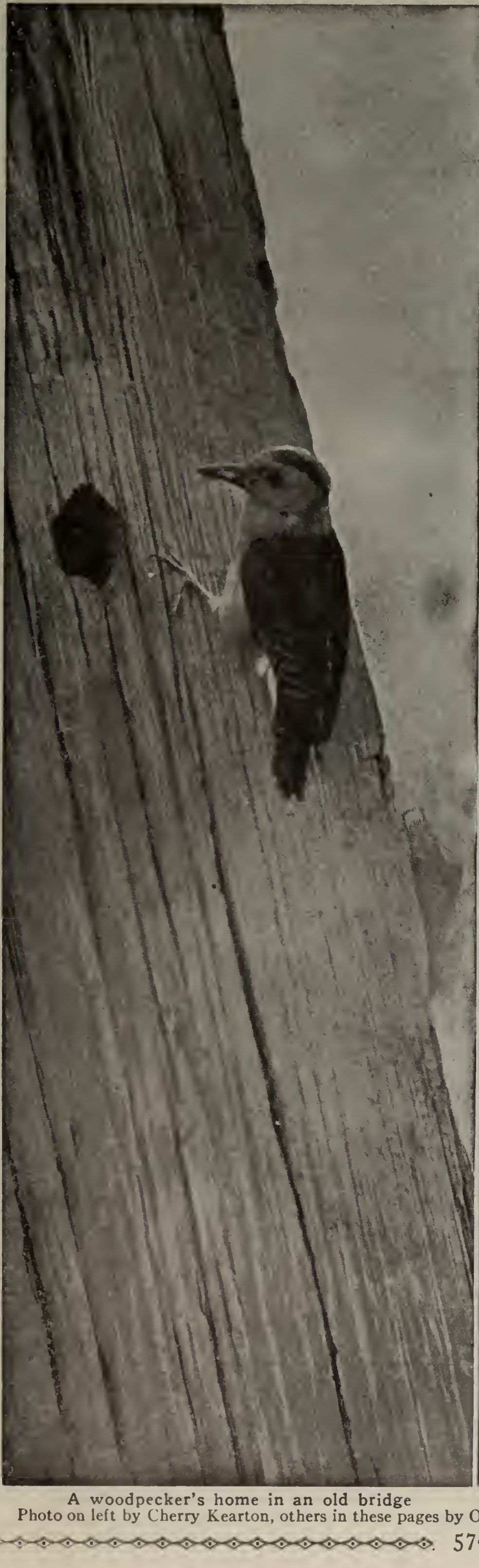
Home of the bower-bird

A great colony of weaver-birds' nests hanging over a river in East Africa

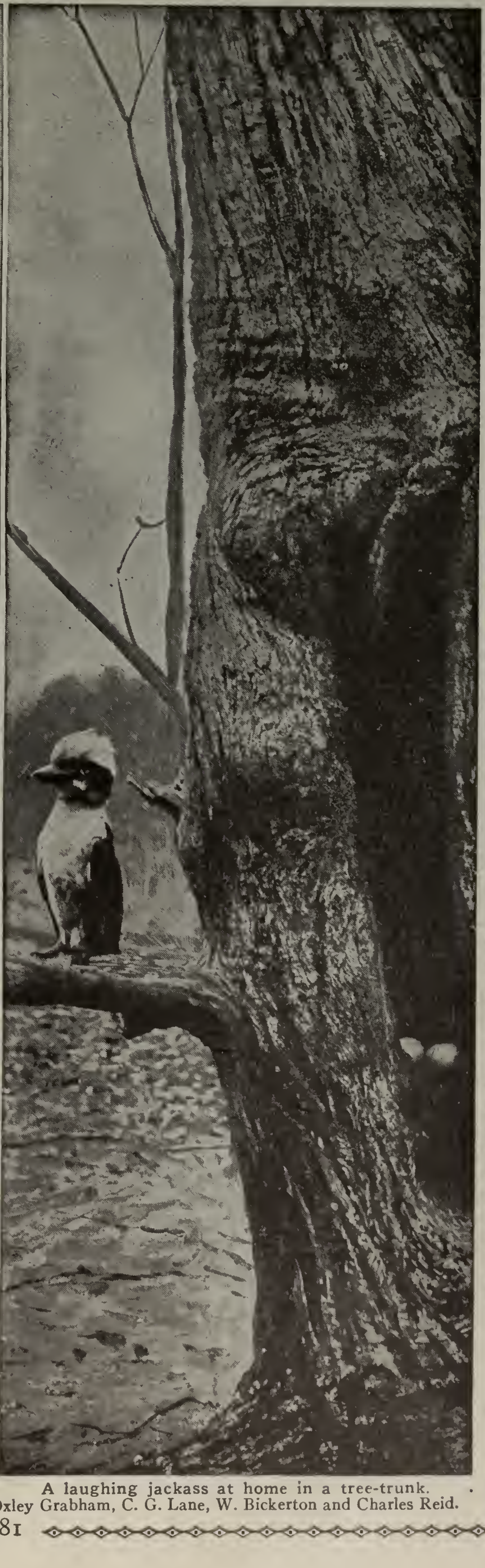
A nest at the end of a leaf


Weavers' nests hanging from a branch

THE BIRD CARPENTERS AND THEIR HOMES



A woodpecker's home in an old bridge



A laughing jackass at home in a tree-trunk.

Photo on left by Cherry Kearton, others in these pages by Oxley Grabham, C. G. Lane, W. Bickerton and Charles Reid.

Rook's nest on a weathercock

Magpie's nest on a chimney-stack

Stork's nest on a chimney

all the year — a lovable little fellow, the greatest admirer that man has. He is the only bird that will fly out of a tree or hedge to come and meet us. Pretend to do a little work on the lawn or in the borders, and down comes Master Redbreast, to learn what you are doing, and, more likely, to see if your labours are bringing to light food for himself. We all know his nest — neat, trim, and round; leaves, dry grasses, and moss cleverly interwoven to make his home. But it would puzzle us to say where he will not build.

WHERE THE ENGLISH ROBINS BUILD THEIR HOMES

A little girl placed in a conservatory a cage which had once housed a dormouse, and in the tiniest part of the cage a pair of robins built a magnificent nest, and reared five strapping young ones. The little girl visited the robins every day throughout the sitting period, and the baby robins daily, until they were old enough to fly away into the garden.

We often read of the nesting-places of robins, and here are a few: A jam-pot in a shed of a kitchen garden; the kitchen mantelpiece of a house; a pipe in the organ of St. Augustine's Church, Bournemouth, England; behind the clock in a public library; near the furnace of a blacksmith's forge; in the basket carried on the bicycle of a lady; in the collar of a coat hanging in a shed.

Luckiest of all was a gentleman, who had a family of robins actually in his drawing-room. In the centre of the room was a palm in a tub, draped with muslin. The two birds flew through the open window, took up their quarters in the tub, helped themselves to moss from other pots of plants in the room, and made their nest, not in the least afraid of the people constantly in and out of the room.

THE DOME OF JENNY WREN'S HOUSE

When we add that robins have built in an English railway car travelling daily from Kingston to Ludgate Hill, we have a representative collection of dwelling-places of this friendliest of little birds. All are good to robins. The owner of the hanging coat let his garment remain where it was until the young birds were hatched and fledged. The people of Kilbagie, Clackmannan, took their letters for post to a special place while robins were hatching a nest of young ones in the local letter-box.

Next to the robin, little Jenny Wren is perhaps our most trustful friend among the birds. It loves to build near us, though it is not so boldly friendly with us as is the robin. For so tiny a bird — one of the smallest we have — it makes a wonderful nest, roofed in with a fine dome, and having the entrance at the side. The shape of the nest makes it the more curious that the wren should choose some of the places in which we find it at home. Wrens have been known to build in potting-sheds over the heads of gardeners hard at work, in the sleeve of a coat left for a day in an outhouse, and beneath the covering of a scarecrow set up to frighten off birds less friendly to man's interests. Perhaps the happiest place chosen by a wren was a great disused cannon in Kiel Harbour.

THE LITTLE TOMTIT AND THE STARLING

Do you ever think why it is that we put up little shelters in which the tomtits may nest? As a rule, the tomtit seeks decaying or hollow trees in which to set up housekeeping. No good gardener will willingly tolerate a decaying tree in his garden, so the little tits find it hard to make suitable nesting-places in our gardens. Luckily, their size helps them. If we leave a good-sized flower-pot upside down in a safe place in the garden, the pretty little birds will make their way through the hole, construct their nest in the pot, and there bring up their brood. Year after year tomtits have built in the post-box fixed on the gatepost of Uttoxeter Workhouse. At least one generation of tits has been reared in a lamp-post at Bude railway station; and winter and summer a pair of tomtits were at home in one of the lamp-posts at Gedling, Nottingham.

The starling is, next to the sparrow, perhaps the most intimate of English bird neighbours. It is not a friendly bird, like some of the others. It takes up its quarters in English chimneys, beneath potting-sheds, anywhere, in fact, where it can creep or dive into a nest hidden from observation. It is an untidy nest at best that it makes, so it is best hidden. An equally close friend — for the summer-time — is the house-martin, which makes a home as clever as a bee's, of mud and straw, a saucer-shaped structure properly ventilated yet so fashioned that neither wind nor rain can enter.

THE BIRDS THAT WENT TO ENGLAND BEFORE MEN

All these birds are examples of the intimate relations between man and his feathered friends. They came to Britain before man arrived; they have seen their old haunts gradually given over to houses and gardens. If they had not adapted themselves to circumstances, they would have perished, or have had to leave the country. But that would never do. Conditions similar to those in England are gradually extending over the whole earth; the birds must make the best of them. And they have done so. They have prospered by taking advantage of the shelter which men's homes afford them. There were, perhaps, never so many starlings, thrushes, blackbirds, sparrows, and robins as there are now;

Redstart's nest in a heap of bricks

Flycatcher's nest in a gatepost

Great tit's home in a nesting-box

and that is good to reflect upon, for it shows that we are not really so hard on bird-life as we sometimes think.

Wonderful as are the nests made by these birds of Great Britain, they are commonplace when compared with the nests of some foreign birds. The weaver-birds weave remarkable structures. Only those who have seen these nests built up piece by piece can understand how clever is the beak which does the weaving.

THE SWINGING CRADLE OF THE TAILOR-BIRD

But even these nests become ordinary when contrasted with the swinging cradle made by the tailor-bird. This bird, with only its beak for needle, sews two or three leaves together in the form of a cup, and in this places its nest of wool, hair, and fine grass. It uses thread, which may be either silk, snatched from some caterpillar's cocoons, or pieces of wool or strong vegetable fibres.

The birds of England and the United States which tunnel and build houses — the swallows and martins — are wonderful, but there is a more famous mason than these — the oven-bird of South America. This bird collects horsehair and fibre, and with these binds together the walls of the mud house which it builds. This mud house is wonderfully designed. It is built on a firm foundation of hardened mud; it has stout walls, and is covered in with a dome — a most difficult piece of work for a bird working with soft mud without scaffolding. Inside, the home is divided by a stout wall into two compartments, one of which is the nursery, and the other the living room.

THE HUSBAND WHO LOCKS UP HIS WIFE

Our carpenter-mason birds would probably own the hornbills as the head of their profession. A pair of these birds make their nest in the trunk of a tree, and the female, when about to lay her eggs, enters the hole and does not come away until the eggs are hatched. There is no way out, for her lord calmly fastens her in by plastering up the hole through which she has entered, leaving only a narrow slit through which she can thrust out her beak to be fed by him. The male has a hard time in feeding her and the whole family which is presently hatched.

Birds build pretty well everywhere, with all manner of material. The kingfisher is content to have evil-smelling fish-bones in the hollow tree-trunk in which it lays its eggs; the hoopoe, similarly housed, has a nest which smells vilely, apparently as a means of protection. A bare ledge of rock for a sea-bird, a hole in the sand for the ostrich, a mound of decaying vegetation acting as a natural incubator for the eggs of the brush-turkey; nests of leaves, nests of spiders' webs, nests of dainty lichens; nests shaped like cups, like bottles, like hammocks, like sugar-loaves; nests made from a sort of glue from the birds' mouths — there is no end to the variety of nest-making, from the simplest to the most complex.

The smaller the bird, the more brilliant its workmanship as a builder. Some of the humming-birds have homes which would charm an artist — nests of silk stolen from webs, and blended with daintily tinted mosses. One bird, the baya of India, actually uses glow-worms to adorn its home. The nest is shaped like one of those wicker-covered bottles in which salad oil is sold, and hangs from a branch of a tree.

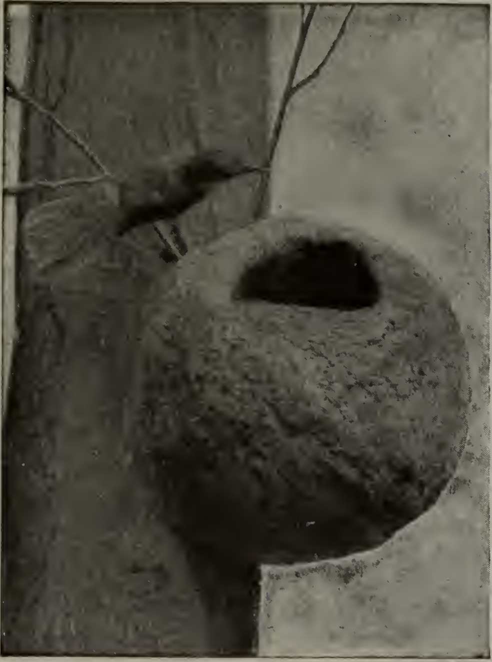
THE LOVELY HOME OF THE BOWER-BIRD

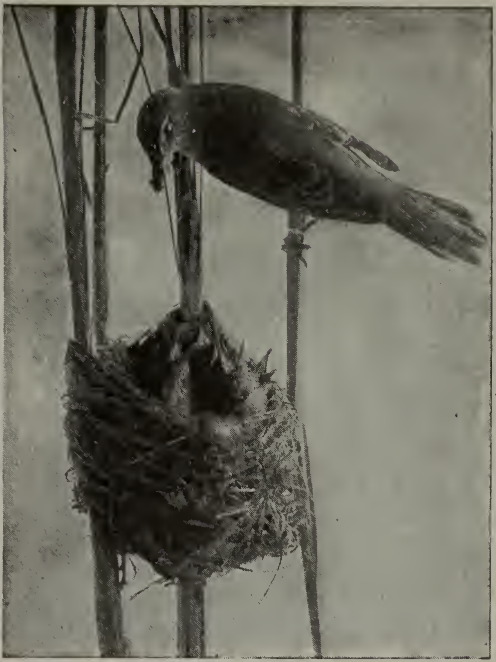
We do not know whether it is a love of beauty which makes the baya thus decorate its home, but we have no doubt about the love of attractive surroundings shown by the bower-bird of Australasia. This bird makes a nest, but, in addition, builds a hall of beauty, consisting of tall grasses, whose heads meet overhead to form an archway. The hall is decorated with bright shells, and any other decorative article that the bird can carry off to beautify its hall.

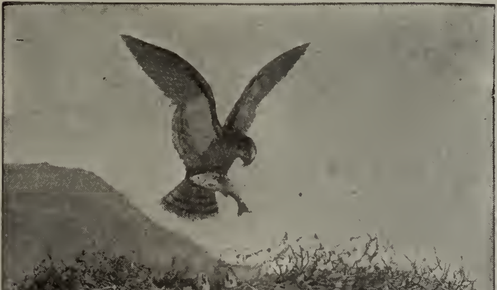
It would require a very big book to contain the whole story of birds' nests, but we have already seen enough of the subject to realise that bird builders are amazingly clever. To them the beak is saw, pickaxe, needle, trowel, and, above all, hands.

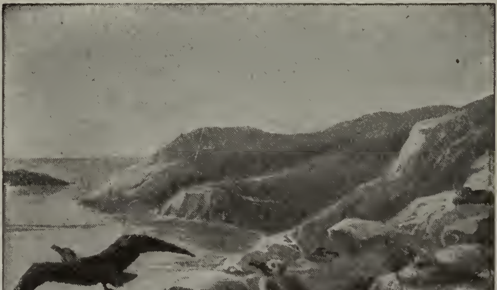
CONTINUED ON PAGE 5827.

FOUR SPLENDID PLACES TO LIVE IN

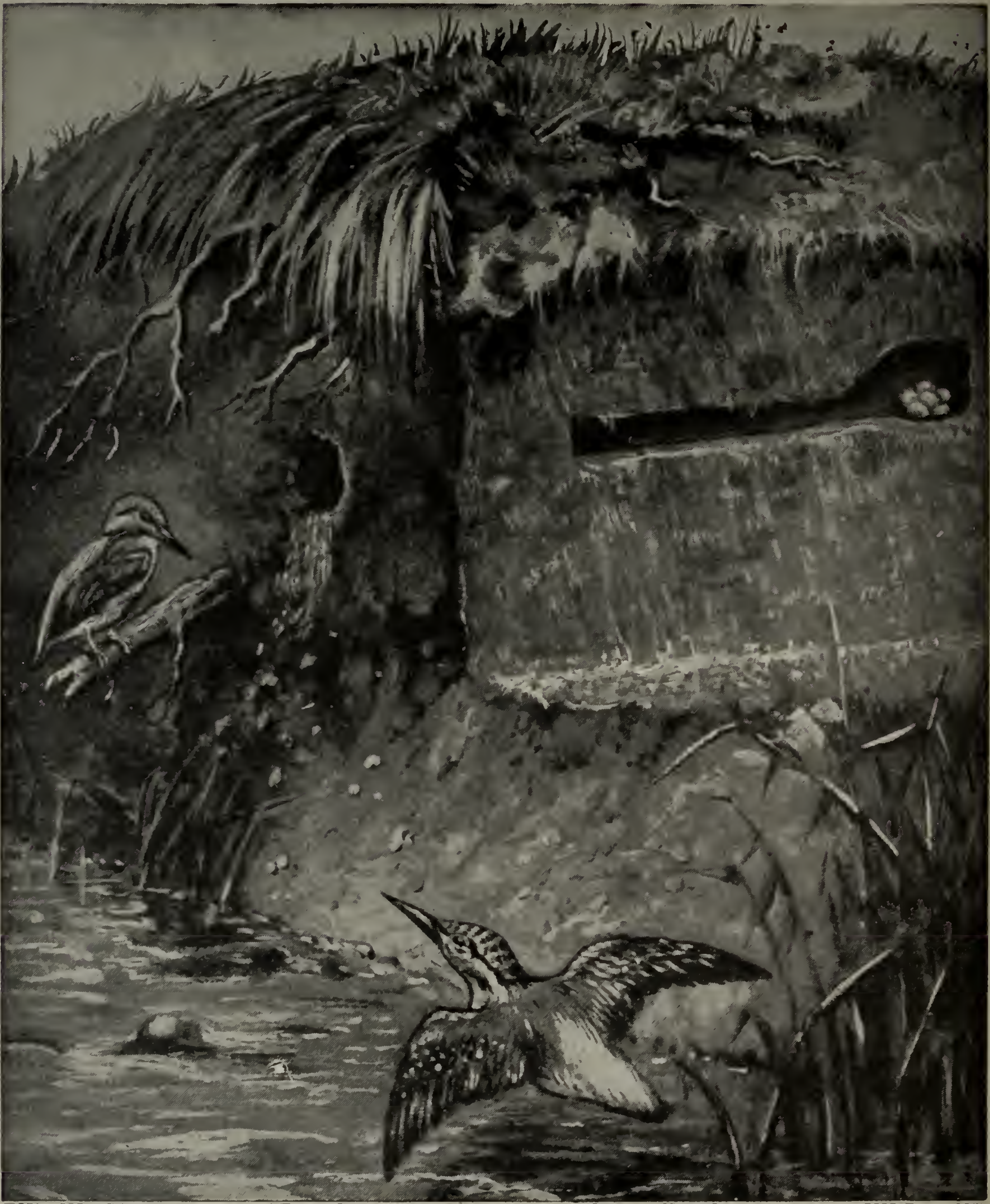

BRAZILIAN BIRD'S NEST FIXED TO TREE


REED-SPARROW'S NEST BUILT ON REEDS


OSPREY'S NEST WITH OTHERS BELOW


ALBATROSS AT HOME ON THE SEASHORE

BIRDS THAT LIVE INSIDE THE EARTH



THE KINGFISHER AND ITS HOME, SHOWING THE LONG BURROW IN THE RIVER-BANK

A SAND-MARTIN'S HOME AS IT APPEARS WHEN THE CLIFF IS CUT AWAY

CONTINUED ON PAGE 5827.

HOW THE MINER GOT HIS LAMP

CONTINUED FROM PAGE 5687

One of the most important journeys ever made by man was undertaken on January 9, 1816, by John Hodgson, the rector of a parish near Newcastle. It was he who first carried a safety lamp into a coal-mine.

Before that day many miners had worked in the darkness of the pits with only a revolving disc of steel spluttering sparks from a flint at the edge. The black air of some mines was filled with gas, which would flame at the touch of a light, and burst with a terrible explosion. Therefore the miners worked with only the sparks of the steel disc to give them the smallest sense of light.

It chanced one day that Sir Humphry Davy, the famous man of science, was staying with friends in Northumberland. Some people there, including Mr. Hodgson, asked him if he could not invent something to prevent mine explosions. They described the horrors of fire-damp, which is like lightning and earthquake combined, and spoke of the awful explosions. Sir Humphry thought over the matter, and began to make experiments.

He discovered a wonderful thing — *flame will not pass through minute tubes.* He put on his thinking-cap — if it was ever off his head! — and came to the conclusion that wire gauze is only a series of little tubes placed side by side. He constructed a cylinder of this wire gauze, and put a flame inside. Light came through the holes, but not flame. And yet, how absurd! Cannot the gas get through those holes and touch the dangerous flame? Yes, indeed; but it cannot get out again *as flame.* That was the discovery.

He sent to Mr. Hodgson for "a bottle of fire-damp" out of the mines, and tried it on his wire-gauze invention. No explosion took place. He then gave orders for a rough safety-lamp to be made.

This was the lamp that Mr. Hodgson bravely carried into Hebburn Pit on January 9, 1816.

On went the clergyman with his flaming lamp, more wonderful than Aladdin's, penetrating farther and farther into the fire-damp. In the distance a lonely miner was swinging his pick by the dim light of a steel-mill. *"Put out that light!"* he shouted, in tones of horror.

That was the miner's welcome of the Davy lamp. Put out that light!

To the poor fellow's utter amazement, the lamp advanced. With terrible oaths he called out that the madman, the fool, the monster carrying it should stop! Still the lamp advanced. Oaths and curses turned to agonised entreaties; the miner cried out with all his soul that the lamp should be put out.

Then his prayers ceased. The mystery of this advancing light, passing so quietly and so safely through the mine, was like something from another world. In breathless silence he waited, as, without a word, the man who held the lamp came solemnly, steadily on. At last he was close to the miner.

The lamp illuminated the face of someone he knew — John Hodgson, the clergyman, the friend of many a poor miner in that black country. The miner could hardly speak. He saw this man holding up in the pit a lamp that shone in the midst of danger, and yet there was no explosion; and he readily forgave the clergyman for frightening him. When Sir Humphry learned of this triumphant success, he was elated. A friend urged him to take out a patent. "It will bring you in £10,000 a year," said he. But Davy would have none of this. He did not want to receive money for saving life.

HOW MAN FIRST LEARNED TO FLY

A SHEEP, a cock, and a duck were the first creatures to ascend from the earth in a flying machine. Before man dared venture into the unknown region of the upper air, he sent these three creatures before him, just as Noah loosed the dove from the ark. The sheep, the cock, and the duck were sent up in a balloon on June 5, 1783, by two young Frenchmen, the sons of a paper manufacturer. The balloon rose from Paris, reached a height of 1,500 feet, and then fell gradually through the air till it reached the earth.

A BALLOON ASCENT WITH ANIMALS

In the same year, on November 21, man himself made his first voyage of the air. Pilâtre de Rozier, a young naturalist, and the Marquis d'Arlandes, a major of infantry, were the first human beings to fly in the upper air. They ascended in a free balloon at two o'clock in the afternoon, before a concourse of people. As the strange contrivance rose with a steady and majestic pace, "wonder, mingled with anxiety, was depicted in every countenance; but when from their lofty station in the sky the navigators calmly waved their hats and saluted the spectators, a shout of delight burst forth on all sides." This first flight by man is said to have been 3,000 feet. The two aeronauts remained twenty-five minutes above the earth.

In 1786 came a balloon fitted with gas-filled wings. This, again, was the invention of a Frenchman. We read that on June 18, 1786, M. Tetsu rose in this extraordinary invention to a height of 3,000 feet, and sailed over the country. Descending to a field for stones as ballast, the car was seized by a farmer and peasants and dragged towards the village. But M. Tetsu suddenly cut the cord held by these peasants, and up shot the balloon. In his ascent he encountered a terrible storm. "The lightnings flashed on all sides, the cloud-claps were incessant, and snow and sleet fell all around him. In this most tremendous situation the intrepid adventurer remained the space of three hours." He passed the night with the stars, saw the sun rise, and descended sixty-three miles from Paris.

HOW IS THE AIR KEPT PURE WHEN THE PLANTS ARE ASLEEP?

We know, of course, that carbonic acid gas is bad for us and bad for animals, and that it is the plants that consume this gas which we breathe out. But what happens in the winter, when the plants are asleep and the leaves are not at work? We must try to find out if the proportion of carbonic acid gas that the air contains is higher in the winter, when there are fewer leaves and less sunlight to break it up.

When we inquire, we find that there is no difference in the proportion of carbonic acid gas in the air at different times of year. We must, therefore, find some way of accounting for the carbonic acid gas which fires and animals and men make in the winter, when there are so few plants to break it up again.

The explanation is that the sea is a great reservoir of carbonic acid, and that it regulates the proportion in the air, so that it always remains very nearly the same. If the proportion in the air tends to rise, as it must do in the winter, the excess passes into the sea, and combines loosely with certain of the salts in sea-water. And if, for any reason, the proportion in the air fell, some of the carbonic acid in the sea would be given back to the air.

WHAT DOES AFFORESTATION MEAN?

This is a long word, but, after all, it is only made from the word forest, which we know very well, and it means making forests. There are many trees growing which no man planted, but since men in the past and to-day cut down many trees for the sake of their wood, or because they want the land for some other purpose, it is very important that new trees should be planted. It would be a very good rule for the future that two saplings should be planted for every tree cut down.

The civilised nations, including ourselves, have been very careless about this in the past, and if we went on as we are doing, there would soon be a timber famine, especially as the demand for paper made from wood is increasing every year. But no individual man can make money by planting trees, for they take a long time to grow. Therefore, afforestation is a work which the nation should undertake. That is already being done very much in Germany, where many thousands of men are always employed upon the State forests, caring for them and extending them. This is one of the things which we are beginning to do in this country.

WHY DO WE THINK WE HAVE SEEN SOMETHING BEFORE, WHEN WE HAVE NOT?

This is a strange thing about the mind which has often been commented on, and various explanations have been given. As usually happens, when anything has to be explained, different people tend to give the explanations which best agree with what they themselves believe on other matters. Now, there are people who believe that each of us have lived many lives before. They suppose that when we die our souls pass into new bodies, and that so we go on from age to age. Such people will answer our question by saying that, though we have never seen the thing before in our present lives, yet we have seen it in some previous state of existence, and the soul remembers.

A much better explanation, which may or may not be correct, depends upon the fact that the brain is made of two halves which are very like each other. Indeed, it is not at all far from the truth to say that, in a way, each of us has two brains. These two parts of our brain, right and left, are connected by a vast number of nerves which run across from side to side between them.

It is quite likely that the two halves of the brain do not always work exactly in step, so to speak. Probably they do so as a rule, but sometimes one may lag a little behind the other. In such a case we might imagine that when the lagging half of the brain saw for itself what had already been seen by the quicker half, the mind, as a whole, might get confused, and wonder whether it had not found itself in the same place before. This explanation must not be accepted as true, because it is only a guess, but it may be a guess that has, at any rate, a basis of truth.

WHEN WE DREAM WE ARE FALLING SHOULD WE FALL IF WE WERE NOT IN BED?

This is not an easy question to answer. We can scarcely have bad dreams unless we are asleep, and as we cannot stand if we are asleep, there would be no farther to fall in any case, whether or not we were in bed. Yet all these questions about dreams and nightmares deserve close study.

So far as we yet understand a case like this, the waking is due to the start, and the start is due to some order that has suddenly been given to the muscles. The sudden muscular twitch wakes us in its own very unpleasant way. The order was sent to the muscles in an attempt to right the balance of the body, which the mistaken brain thought to be in danger.

So far, so good, but now, why did the brain have the notion that we were falling when, in point of fact, we were lying safely in bed? The answer seems to be that our idea of the position of our bodies largely depends upon messages sent up to the brain from the inside of the body, and not least from the neighbourhood of the stomach. But, when the stomach is out of order, wrong and misleading and unpleasant messages are sent, which the brain, when the judgment is asleep, interprets as meaning that we are falling. The moral is that people who have such nightmares should be very careful about what they eat immediately before going to bed.

CAN A DOG REASON?

The boy who asks this question has seen a dog stand at a street corner as if considering which way to go, and then go up one street and suddenly turn back and go up another, and he wonders if this means that the dog is "making up its mind."

Well, there is some evidence which proves to us that dogs can reason up to a certain point, and we are bound to call them intelligent, and more than instinctive animals. But the case referred to when this question was asked by no means proves that dogs are able to reason.

In order to explain such a case as this we must remember that dogs possess one very important sense, the sense of smell, which is so feeble in ourselves that we can scarcely realise the part it plays in a dog's life. When the dog goes a little way up one street, after seeming to consider, and then turns back, it does rather look as if he had been reasoning and had decided that, after all, the other street was best. We can see no reason why he should change his mind. But the truth is that we can *smell* no reason why he should change his mind, and so it looks as if he had been guided not by anything outside, but by his own arguments.

The dog's world is mainly a smell world. What happened in this case was that the dog's brain, at the parting of the ways, was uncertain as to the direction of a scent the dog liked, or as to the nicer of two scents, and when the dog turned back it probably was because, on further smelling, the scent up the street he had chosen disappointed him. We live mainly in a seeing world, and our deeds must often be just as puzzling to a dog as his deeds are to us.

WHAT MAKES THE HALO ROUND THE MOON?

When we look at the moon and see what appears to be a beautiful halo all round it, we are naturally apt to suppose that the halo is really round the moon. But that is very far from the case. The halo is really nowhere near the moon at all. If it were, no doubt we should expect to see it round the moon always, but instead of that we see it only at times, and in certain states of our air. Also we notice that certain kinds of weather are apt to go with halos round the moon, a fact which plainly shows that the halos are made by something in our air, which is practically as far from the moon as we are ourselves.

There must be something in our air which bends the rays of light in a regular way, so as to form a circle, sometimes larger and sometimes smaller, round the image of the moon that we see. This is done by water in one form or another, sometimes, it is supposed, by raindrops, sometimes by frozen water existing in the form of ice-crystals.

WHY DO FLOWERS DIE SO SOON?

We are apt to think of flowers as the whole plant, but that is a mistake. The flower is the most beautiful part of a plant, and the part easiest to see; but it is only part of the plant, made for the special purpose of producing seeds from which new plants will grow. The process of preparing seeds has been going on long before the flower opens; then, when it does open, it gives the signal, by its beauty or its scent.

Insects promptly visit it, and by carrying to the flower some yellow pollen, which they have got from another flower of the same kind, they make the seed quite ready to grow into a new plant. When this is done, the petals of the flower, which are the beautiful part we see, have no more use; they drop off, and we say that the flower is dead. But this is not death; it is part of the processes of the life of the plant that are going on from generation to generation.

DOES THE SUN KEEP STILL?

No. We have perfect proof that the sun moves in two different kinds of ways at least, if not more. For one thing, the sun spins upon itself. This we know because we can watch sun-spots appearing on one side of the sun, travelling across its face, disappearing, and then coming back again after an interval of days.

The sun spins in the same direction as the earth spins, and in the same direction as that in which the earth revolves round the sun. Secondly — and this is far more astonishing and tremendous — we can prove by watching the positions of the stars that the sun is moving through space, and all his family, of course, including ourselves, must be moving with him.

There is a glorious bright star, Vega, one of the whitest and most splendid stars in the sky, which is said to represent about the point toward which the sun and his family are at present moving. The rate of that movement is believed to be about twelve miles a second.

IS IT POSSIBLE THAT MONKEYS WILL EVER BECOME MEN?

There is no great future for the race of monkeys, simply because they are so far behind to-day that they have lost the race for ever. Thousands and thousands of years have passed since man became master of the world once and for all. All other creatures are more and more coming under his will, wisely or unwisely. There are four kinds of monkeys that form a special group of their own, and are called man-like.

Two of these exist in the Congo forest, and will probably soon become extinct; the other two live in Malaysia, and their fate, though probably not quite so near at hand, will doubtless be the same.

CAN INSECTS COMMUNICATE WITH EACH OTHER?

Insects are, perhaps, the most wonderful talkers in the animal world. They make us realise that communication does not depend upon tongue and lips and voice alone. They talk with their feelers, or antennæ, as they are called. There is no doubt about it.

If the bees in a hive lose their queen, they do not all immediately discover it. The saddening fact becomes known at first only to a few. But these meet others, whose antennæ they touch with their own, and so tell the direful story. These communicate the news to others, and so the news is spread. Soon the hive is in an uproar.

Very much the same sort of language must be employed by the ants. All their words are spoken by means of their feelers. No one who has watched them at work can doubt that the wonderful cities of the bees and ants are regulated by strict discipline.

To see whether the habits of ants of communicating news was to be observed when they were in a state of captivity, Huber, the great naturalist, placed a large number of them in a closed and darkened chamber. At first the ants scattered in much disorder. By-and-by an ant discovered a way out of the darkened chamber. He returned to his companions and touched several of them with his antennæ. Soon all the ants assembled in lines, and marched out with one impulse, the desire for liberty being thus communicated.

DO BIRDS TALK TO ONE ANOTHER?

There can be little doubt that birds have an extensive language, but not all of it that we hear is important; some birds chatter for the love of hearing themselves, and we are all glad that they do. But they have their important talks, and we know positively that it is serious language which they use. Men who devote the greater part of their leisure to the study of birds and their calls can deceive birds by imitating those calls. Men get to know that certain calls are followed by certain results, so, hiding themselves on the shore or in the fens, they utter these cries, and birds, wild and nervous as only wild birds can be, will drop from the clouds to answer the call, which they imagine to be made by some bird of their own species. Fowls afford a good opportunity of studying bird language.

We may note the language of the hen when she has laid an egg; when she warns her chickens of danger; when she calls them to rest under her wings; when she calls them to food.

DO ANTS CATCH SLAVES AS MEN USED TO DO?

There is not the slightest doubt that ants do catch slaves, and that they hunt for slaves in parties.

When the slave-making ants desire to plunder some prosperous home of the ants called Formica fusca, they do not all wander off, aimlessly searching. No; for weeks they have properly organised parties of scouts and spies going out every day, searching the country far and near. These scouts return at night and present their reports; for the general mass of the ants never go out until the spies bring news of nests to be plundered.

When such a nest has been discovered, the slave-hunters sally forth in a body to rob it. Generally the march to the nest is well ordered, but in the rush for plunder some confusion may arise.

Then groups of the party of slave-hunters will lose their way. As soon as this happens, scouts will be sent out by the lost ones. The whole party of the latter will remain perfectly still until the scouts have scented out the trail. These scouts return to their friends, and tell them the news. Then they set forth again on the trail, and march on to the nest to join in stealing the infants of the nests, whose home is thus broken up.

IF WE CAN LIFT THINGS, ARE WE STRONGER THAN THE PULL OF THE EARTH?

If we can lift a thing, certainly we are stronger than the pull of the earth *for that thing;* and when we cannot lift a thing, it is because we are less strong than the pull of the earth for that thing.

The force of gravitation depends in an absolutely regular way upon the amount of matter in question. A small stone is pulled upon by the earth to a certain extent with a certain force, which is not very great, though the earth is large. For though the earth is large the stone is small, and the force of gravitation depends upon the size of the two things in question. But if the stone be a great rock, then the force of gravitation is proportionately greater, and we cannot lift it.

WHY DOES A KITE KEEP STILL AT A GREAT HEIGHT?

As you read this you may be looking out across a sea-bay. Here and there along the coast you may see the water being disturbed in small patches by the gusts of wind blowing off the shore.

Farther out to sea the water is all in the same state, not patchy. This means that the wind near the shore is blowing in little bits at a time, and if you were in a small boat you would feel it quite strong at one moment and not at all a few yards farther on. If you were flying a kite close to the ground, it would dive unsteadily in these small gusts, but far out at sea it would fly quite steadily. So it would if it got high up in the air.

The reason is that the surface of the ground is very uneven, broken up by hills and valleys and trees and houses and bays and promontories, round all of which the gusts blow at intervals. This is why boating is dangerous on lakes, and in similar places; and the same thing accounts for some of the accidents which happen to airships.

WHAT IS THE SMALLEST DISTANCE WE CAN MEASURE?

The ordinary way of measuring any distance is by what we may call mechanical means — the same in principle, though vastly more delicate, as measuring by means of a foot rule. The best possible that can be attained in this way is to measure to about one twenty-five thousandth part of an inch. This particular distance is much used in science, and has the Greek name of a "micro." It is the thousandth part of a millimetre in the metric system.

But it is now possible to measure distances in a wholly different way by means of light. Light consists of waves of known lengths, and this fact can be used for the measurement of very minute distances. In its delicacy this method far surpasses anything that can be approached by mechanical means, and the unit of distance which can be measured by means of ordinary red light is actually not more than one eight-millionth part of an inch.

WHY IS IT IMPOSSIBLE TO SINK IN THE DEAD SEA?

We can sink only in water which is less dense than our bodies. Fresh water is less dense than sea-water, and that is why it is easier to float in sea-water. The water of the Dead Sea and of the Great Salt Lake in Utah, contain so much salt that it is denser than our bodies, and so they will not sink in them. People who visit them often bathe in them as an experiment.

One writer says that a bath in the Dead Sea is "both pleasant and refreshing;" but Sir Francis Galton, the famous traveller and man of science, actually made the experiment himself, and this is what he says: "I tasted and foolishly bathed in the nasty, sticky, dense water of the bituminous Dead Sea, which stuck in my hair for the day."

There seem to be three reasons which account for the extreme saltness of the Dead Sea, which has actually more than one part of salt to three of water. The first is that much of the water which runs into the lake has run over the salt range of Sodom, and thus carries in large quantities of salt. Then there is a large number of salt springs which run into the Dead Sea at various points along its shores. And, lastly, there is evaporation of the water of the Dead Sea, which flies away into the air, leaving behind the salt which it brought in.

WHY CANNOT FISH LIVE IN THE DEAD SEA?

The Dead Sea was first so named by the great writer Jerome, because no form of animal life is found in it. This can readily be explained when we study the composition of the water. It would, in the first place, be difficult or impossible for a fish to keep under water — which is as necessary for it as it is for us to keep above water — in the Dead Sea, so dense is the water owing to the salt. And, in the second place, the salts found in the water include some which are powerfully antiseptic, or fatal to life in any form. There is actually in it three per cent. of the salt called chloride of lime, which is very poisonous to all forms of life. More than half the salt of the Dead Sea consists of chloride of magnesium, and its composition is thus very different indeed from that of ordinary sea-water.

ARE THE STRONGEST NATIONS THE HAPPIEST?

One is always inclined to believe that the nation is best off which has the greatest army and navy and the greatest material power.

But it is by no means so certain that the citizens of Switzerland and Holland and Sweden are less happy and to be envied than those of the "Great Powers," as they are called. When we come to look at the facts fairly, we find that a little nation may be just as prosperous as a big one, its citizens less burdened, its children better cared for, its laws more just and humane and progressive.

It is among the Great Powers, like Russia and Austria and England, that we find a very high death-rate among babies, and it is in small countries, like Norway and Sweden and Switzerland, that we find the figure lowest. We also find that the amount of trade done by the small and weak nations is often higher, when reckoned for each person, than that done by the strong nations.

WHY THINGS ARE DONE

WHY A SHIP HAS FIGURES ON THE BOW

THE reason why vessels have a series of numbers expressed in Roman figures painted on their bows may not be known to all of us. The numbers always run upwards—that is, the highest number is at the top—and the series starts from the keel of the vessel, although, of course, we cannot see these lower numbers unless the vessel is in dry dock. The figures are placed a foot apart, and show at a glance how much of the ship happens to be below the water. In the picture fourteen feet of the boat are under water.

WHY PAILS OF SAND HANG IN SOME BUILDINGS

IT is the usual thing to see hanging in large buildings—museums, factories, offices and so on—rows of pails containing a liquid, which can be used for extinguishing the flames in case of fire. It is quite common nowadays to see also a pail of sand hanging with the others or in a place by itself. This sand is for use in case of fire caused by an accident to the electric wires, bringing about what is known as "a short circuit." If water were used, it would spread the electric current and probably increase the danger, but sand, properly used, very quickly extinguishes the flames.

WHY FOOLISH PEOPLE HANG UP HORSESHOES

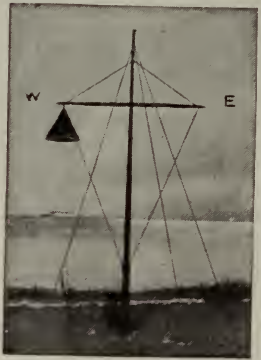
THERE are still very many people who are foolish enough to think that if they find a horseshoe and hang it up over their door they will be lucky. This is just a silly superstition that ought to have disappeared altogether. It dates back to the very ancient times when people used to try to discover the future by means of lucky numbers and curious calculations. From the earliest times seven has always been regarded as a very lucky number, because it is used so much in the Bible, and anything that might be found that had seven holes or seven spots was considered to bring good fortune to the finder. A horseshoe usually has seven nail-holes, and so it was supposed to keep away witches from the home or stable. No reader of this book will be so silly as to think a horseshoe brings luck.

WHY A SAW HAS A LITTLE NOTCH ON TOP

ON most big saws there is a little notch near the end and at the top. This is put there as an aid to the carpenter in his work. Very often, when a thick plank or beam is being sawn, the sawdust or large fragments of wood get wedged into the cut, and make sawing difficult. The carpenter then takes out the saw, turns it round the other way, and, with the notch, clears the obstruction.

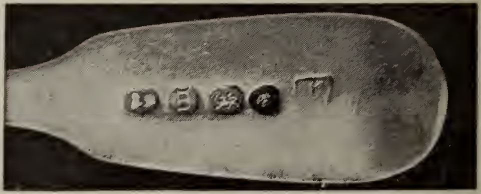
WHY A CONE IS HOISTED AT THE SEASIDE

WHEN we are at the seaside we may often see flags of different colours flying from some exposed point. When we inquire we are told that they are storm flags to show the sailors that bad weather may be expected. In England, a cone is used instead. When the point is downward the storm is coming from the south, and when it is uppermost the storm will be from the north. According as the cone is hung on the eastern or western yard-arm of the flagstaff, so the storm may be expected from the north-east or south-east, or from the north-west or south-west. Our picture signals a storm expected from the north-west.



WHY A SILVER FORK HAS MARKS UPON IT

SOME silver forks and spoons have little marks stamped on them, and the whole series is called the hall-mark, or plate-mark. The lion in the picture indicates the quality of the metal, and the m is a sign for the year in which the plate was made and marked. The other marks include the head of the reigning sovereign, a symbol to represent the town where the article was stamped, and the maker's initials.



CONTINUED ON PAGE 5843

A WISE king, it has often been said in our story books, would make his people happy, and not only our story books but great men have declared it, too. The great thinker Plato, in writing of his ideal city, said that the world could never be free from ill until philosophers are kings, and power is given into the hands of the wisest men. But happiness is not the gift of kings. Once in the history of the world the conditions of Plato were fulfilled; in Marcus Aurelius we find the philosopher-king, the ruler who preferred the solitude of the student to the splendour of the palace, the soldier who loved peace better than war. Yet Marcus Aurelius did not make Rome happy. True it is that happiness depends upon ourselves, and not upon kings, and here we read of the wonderful man who, with the secret of happiness in his grasp, could not give it to the people, though he was Emperor of Rome and all but master of the world.

CONTINUED FROM PAGE 5759.

A THINKER ON A THRONE

MARCUS AURELIUS AND HIS WONDERFUL BOOK

WE never know where a thinker may be found. He may be a man who is cleaning out a sewer, or a professor in a university; she may be a mother with her child in a cottage; or we may even find a thinker upon a throne. The man we are now going to study was an Emperor of Rome. He was almost the only Emperor in history who at the same time was a philosopher.

That is not entirely true, because we have lately learnt that there was a great Egyptian monarch who lived vast ages ago and was a true thinker. He refused to worship the gods of the time, and set up the religion of the one and only God.

The name of this wonderful man has scarcely been heard of yet except by those who study ancient Egypt, but it was Akhnaten, better known as Amenhetep IV. Again, the Emperor Akbar, who lived in India three hundred and fifty years ago, was a great thinker. He believed that there was a portion of truth in almost all religions, and he hated all persecution. As a law-giver he was just and humane. He sought to teach people a new religion which should unite them all and put an end to their quarrels. He said that in every temple and in every language men were feeling after God; not only in the Mohammedan mosque, but in the Christian cloister also. The more we learn of this remarkable man, the more we must admire him. For instance, he forbade the marriage of tiny children in India, and though the rule was that widows were burnt when their husbands died, he allowed them to go free if they chose to do so. Tennyson has written a noble poem, called "Akbar's Dream," which gives us a beautiful idea of this great man.

Here we are to deal with the much more famous emperor and thinker who was a Roman. It would be wise, however, to put together in our minds the names of these three, the Egyptian, the Roman, and the Indian — to take them in their order of time — produced by the human race so far apart in place and thousands of years apart in history, as if to show us, and yet not too often, the astonishing spectacle of Wisdom enthroned. Kings and emperors there have been in great number since the beginning of civilisation. We may marvel that more of them have not come down to us as thinkers.

Perhaps thrones are not good places for thinking; perhaps if a man must attend to the business of the moment, fathom his flatterers, defeat his enemies, he has no time for thinking, even if he has the mind. But at least we can remember the names of these three great A's —

Akhnaten, Aurelius, and Akbar, and here we are now to study the greatest of them, who, unlike the others, has left us a wonderful book.

Marcus Aurelius was born in 121 A.D., and became Emperor of Rome in 161, and died in 180. The first mistake we are apt to make is to assume that because he was an emperor he was therefore fortunate and happy, and had every opportunity of enjoying himself. That would be a great mistake.

There was trouble in Rome, there was fighting to be done far away from Rome. The imperial author did not sit at ease in a palace and compose his book as a pleasant recreation. On the contrary, it was written just as things occurred to him.

Marcus Aurelius as a youth

Yet at the same time this man was a mighty emperor. He knew what power meant. When he expressed his opinion as to the value of different things, his opinion was worth having. A poor and despised man may live in a tub, and declare that power, and money, and luxury, and beautiful things, and music, and dainties to eat, and the homage of mankind are not worth having. He may be right or wrong, but we cannot regard him as a judge, as we must an emperor who has command of all these things, has seen them around him, has weighed them fairly in the balance, and found them wanting.

It is plain that Marcus Aurelius was destined to be a thinker from the very first. He was well taught as a small child, but he quickly turned aside from ornamental studies, such as the arts of making verses and of elegant speaking, and turned to philosophy. When he was only eleven he began to wear the simple dress which the Stoic philosophers preferred, and lived in their simple fashion. He became a Stoic, accepting all the rules which made the whole of life a discipline, forbidding all pleasures, as we usually understand pleasures, and throwing scorn upon every ordinary comfort. The boy who preferred this rule of life was to become emperor, master of the one great empire then existing in the world.

Marcus Aurelius loved peace, but he was destined to have to fight. Often he had to fight along the Danube, and sometimes we have a note which tells us that at such and such a spot on its shore he jotted down an idea which is precious to us to-day. Marcus Aurelius had to cope with the plague, a terrible disease which reached Italy from the East, and with famines and with treachery. When one of his most trusted generals turned upon him and tried to obtain his throne, and was killed by one of his own officers, Marcus Aurelius only regretted that he should not have had the chance to forgive the traitor, and he actually destroyed all the evidence which might have condemned others in the plot. It is a very sad fact that this emperor permitted a persecution of the Christians, but we must remember that Marcus Aurelius was quite unaware of what the Christians taught, and only knew of them as rebels, enemies of the empire. This great man died at the early age of fifty-nine, exhausted by his efforts in winning one more victory for Rome against the hordes of the north. Dean Farrar has called him "the noblest of pagan emperors," and another writer has said "we must sorrowfully acknowledge that we must seek in vain for a Christian monarch to place beside him."

Marcus Aurelius is one of the greatest men of all ages because of what he has taught us regarding goodness, and virtue, and duty, and because the circumstances and deeds of his life add so much to the value of what he taught. In his case we are not compelled to learn of his thought at second-hand by means of what others remembered and wrote down. We actually have a book, known as the "Meditations of Marcus Aurelius," which consists of the original Greek jottings made by the emperor from time to time under such circumstances as we have seen. The book is not a large one, and in time to come we must read it through, for it is readily to be had in English at a small price. Here we can take out of it just those parts which are most valuable, and which we can best understand.

It is plain from what Marcus Aurelius tells us that he was well taught and had good parents and grandparents. He tells us that his grandfather had a good temper, that his father was modest and manly, that his mother taught him to honour religion, to be generous and open-handed, and to hate the idea of hurting anybody. Such were the beginnings of this great man. He had splendid teachers, also, who advised him and taught him about all manner of things, so that he learnt, as he tells us, "how to receive an obligation, how to receive a favour without either lessening myself or seeming ungrateful to my friends," not to be always saying that he had no time to write a letter, and a hundred other things, some solemn, some amusing, every one of which it is worth our while to know to-day.

THE SAYINGS OF MARCUS AURELIUS TO HIMSELF

These meditations of Marcus Aurelius are written as if he were talking to himself, and we must understand that, as we read them. When he says, for instance, "Remind yourself every morning that before night you will probably meet some thoroughly objectionable person," he is not giving advice to his readers, but to himself. His book was not meant for any eye but his own. Remembering this, we may quote, in free translation, a number of the thoughts which this great man noted down for his own instruction, and which other men have admired and profited by for nearly 2,000 years.

As regards the objectionable person, you are to remember that both his mind and yours come from God, and that we are all made for mutual help, like the rows of the upper and under teeth. Whatever man you meet the universe has need of him. You are a man and a Roman, and you must act accordingly. This is possible if you will but perform every action as though it were your last.

Further, it must be remembered that there are some people who are busy and yet do nothing. They fatigue and wear themselves out, and yet aim at no goal nor propose any general end of action or design.

You are to act as if at any moment you might die; nor is that to be feared. If there be gods or Providence, you are safe, and if there be not, a world without them is not worth a man's while to live in. Death and misfortune do not touch the man himself. Living and dying, honour and shame, pleasure and pain, riches and poverty, happen indifferently to the good and to the bad, and are in themselves neither the one nor the other. The whole extent of life is but a point, and the body is always tending to decay. We cannot tell our fortune, and fame is not worth having. What, then, is worth our while? It is to preserve the godlike that is within us.

We must attend to our souls because our bodies are doomed. Hippocrates, who cured so many diseases, himself fell ill and died. Alexander and Pompey and Julius Cæsar, who wrought so much destruction, were themselves destroyed at length, Democritus was consumed by vermin, and another sort of vermin destroyed Socrates.

It is a good rule not to think about things which we could not freely talk about if anyone should ask us, "What are you thinking of?"

Do not try to be witty and brilliant in your talk; act like a Roman emperor who loves his country, but be cheerful and find your peace of mind within yourself, without having to depend upon supports from outside — so to say, do not throw away your legs to stand upon crutches.

It is not really necessary to have to leave the city in order to get peace. We should learn how to withdraw into ourselves, and find peace within our own minds, even if we are in the midst of a crowd.

Do not act as if you had ten thousand years to throw away. Death stands at your elbow. Be good for something while you live and it is within your power. Soon you will be returned into that universal mind which gave you your being.

A good rule is to avoid unnecessary things. The greater part of what we say and do is unnecessary. If we omitted it we should have both more leisure and less disturbance. The blind man is he who shuts the eyes of his mind. The mind is the living thing, not the body, says Epictetus; you are a living soul that drags a corpse about with her.

> If we wish to know the true worth of people we must look into their minds, and see what are the things that they pursue and the things that they avoid. The worth of a man is the worth of the things to which he devotes his life.

This last saying of Marcus Aurelius is so splendid that we should pay special attention to it. We live in a very vulgar age, when, if a man dies, we say, "What is he worth?" not meaning in the least what was *he* worth, but merely "How much money did he leave?" Whenever and wherever we judge like this, we are turning our backs upon all that is real and beautiful and good and enduring, and worshipping nothing but a passing show. The worth of a man is the worth of those things to which he devotes his life, and if those things are merely money and possessions, then he is worth in himself what they are worth in themselves, which is exactly nothing. Marcus Aurelius not only meant what he said about the worth of people — emperor as he was, yet willing to learn from and quote a lame and alien slave like Epictetus — but at some other time he jotted down a note or two which will make us think more about the worth of people, and will teach us to see that sometimes when we say a man has died worth a lot of money, he may really have been dead for twenty years before.

Said Aurelius: "If a man begins to grow old, it is true that the mere animal life goes on. He may breathe and be fed and see and be hungry for many things, but to make any proper use of himself, to fill up the measure of his duty, to distinguish between what seems and what really is — for all such noble uses of reason and judgment, the man is perfectly dead already."

Here is one of the longest notes in the book, which is a great piece of writing, and therefore must be quoted exactly as it is written, so far as English can give the effect of the Greek:

> Consider how many physicians are dead that used to knit their brows over their patients; how many astrologers who thought themselves great men by foretelling the death of others; how many philosophers have gone the way of all flesh, after all their learned disputes about dying and immortality; how many warriors, who had knocked so many men's brains out; how many tyrants, who managed the power of life and death with as much insolence as if themselves had been immortal; how many cities, if I may say so, have given up the ghost—for instance, Helice in Greece, Pompeii and Herculaneum in Italy, not to mention many besides. Do but recollect your acquaintance, and here you will find one man closing another's eyes, then he himself is laid out, and this one by another. And all within a small compass of time. In short, mankind are poor, transitory things! They are one day in the beginning of life, and almost the next turned to mummy or ashes. Your way is therefore to manage this minute in harmony with nature, and part with it cheerfully; and like a ripe olive when you drop, be sure to speak well of the mother that bore you, and make your acknowledgments to the tree that produced you.

This great emperor and thinker was human, like the rest of us, and here is something he once wrote, reproving himself, which illustrates it:

> When you find you do not want to get up early in the morning, make this short speech to yourself: "I am getting up now to do the business of a man. Was I designed for nothing but to doze and keep warm beneath the counterpane? Is not action that for which you were made? Shall not a man act like a man? Indeed, you have no true love for yourself. If you had you would love your nature, and honour her wishes.
>
> "I will march on in the path of nature till my legs sink under me, and then I shall be at rest, and expire into that air which has given me my daily breath.

A little later we find him asking a great question, which reminds us of what Buddha taught about men's souls and where they are going. After declaring that "a man has work enough to make himself tolerable to himself," he asks:

> What use do I put my soul to? It is a useful question this, and should frequently be put to oneself. How is my soul now? Whose soul have I now? That of a child, or a young man, or a feeble woman, or a tyrant, or cattle, or wild beasts?
>
> I am made of soul and body; neither can be destroyed, for neither was made out of nothing. Therefore every part of me will serve to make something in the world, and this another and another. Thus was I made, and my father before me, and so backwards through eternity.
>
> The vast continents of Europe and Asia are but corners of the creation. The ocean

is but a drop, and Mount Athos but a grain compared with the universe, and now but a moment compared with eternity. These things are not small, changeable, and passing. Remember, too, that all things come from the soul of the universe, whether directly or indirectly. The lion's growl, the serpent's poison, and whatever seems offensive in nature, such as thorns or dirt, are the outcome of something noble and beautiful.

These fine words have for us a lesson even greater than we may realise at first sight. No one who remembers his Bible can read them without seeing that what Aurelius teaches is exactly the lesson taught us in the Bible when the Apostle was reminded that nothing which God has made is common or unclean. We might very well believe that when he wrote these words he had been influenced by reading the Bible, though, of course, he knew nothing of it. In a famous phrase of one of the early Christian writers, he had "a soul naturally Christian."

Marcus Aurelius applied his great principle, which we have just studied, in that direction where we all find it so difficult to apply it. He taught not merely that thorns and the poison of the serpent and dirt are to be accepted, but that we are to accept all kinds of men, even those who most annoy us. The universe for him was a great whole.

All people work in some measure towards the ends of Providence, some with knowledge and design, though others are not sensible of it. And thus, as I remember, Heraclitus observes that those who are asleep may be said to help the world forward. In short, the grand design is carried on by different hands and different means. For even he that, complaining, makes head against his fate, and strives to pull the administration in pieces, even such a testy mortal as this contributes his share abundantly.

The emperor goes on to say that, as we must certainly play some part, let us see to it that we do not play one which is humble and ridiculous, but "He that governs the world will certainly make you useful for something and prove serviceable to His scheme, one way or other."

Here, finally, are just a few striking sentences which will help to complete our impression of this great thinker.

Let people's tongues and actions be what they will, my business is to be good, and say to myself what a piece of gold or an emerald would. "Let people talk and act as they please; I must be an emerald, and I must keep my colour."

It is great folly not to part with your own faults, which is possible, but to try instead to escape from other people's faults, which is impossible.

Marcus Aurelius pardoning his enemies

If you know how to attain wisdom, never be concerned about missing the credit for it.

Alexander, Julius Cæsar, and Pompey—what were they compared with Diogenes, Heraclitus, and Socrates? These philosophers looked through things and their causes, and were ruled by nature, but as for those great princes, what a load of cares were they pestered with, and to how many things were they slaves.

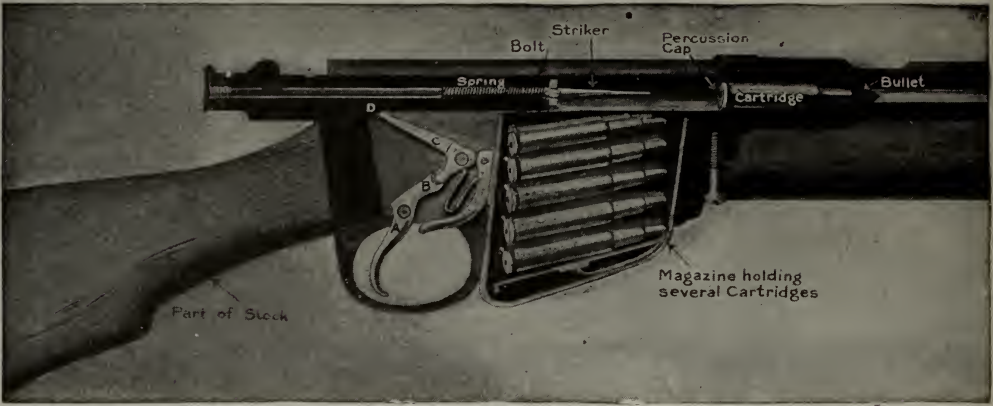
You have obliged a man, and ask for gratitude or a reward. This is as if an eye or a foot shall demand a salary for their service. They are made for certain purposes, and so man is made to be kind, and therefore when he does a good office and proves useful to the world, he has fulfilled the end of his being and attains his own reward.

Here we must part from this great man, but if, when we grow up, we have time to read anything, we must find time to read and understand his great small book from beginning to end.

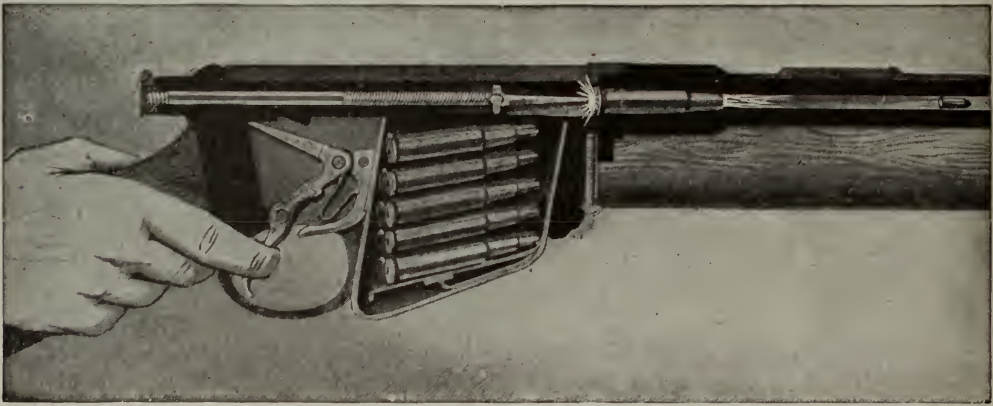
CONTINUED ON PAGE 5834.

CONTINUED FROM PAGE 5737

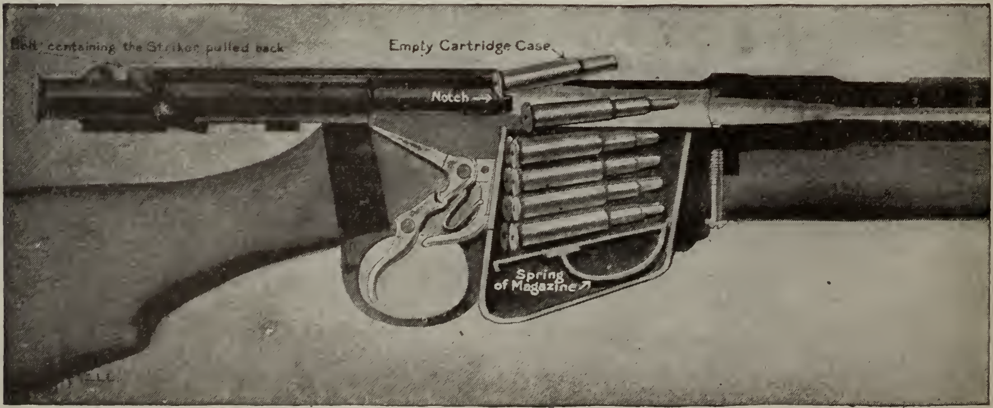
HOW A RIFLE FIRES TWELVE BULLETS



These pictures show how a rifle may fire several bullets without being reloaded after each shot. The rifle is here set ready for firing. The needle point of the striker and the bolt are drawn back, and the cartridge which contains the bullet lies in its socket waiting for the striker to spring forward and strike the percussion cap in the cartridge. This is done by pulling the trigger, a, which lowers the elbow joint at b and pulls down the sear, or pivoted catch c. This catch rests against the notch d, called the cocking piece, but so soon as it is lowered the bolt and striker are moved rapidly forward by means of the spring, with the result shown in the next picture.



The spring has now shot the bolt and striker forward, striking the percussion cap in the end of the cartridge, just where we can see a spark or flash in the picture. This sets fire to the explosive in the cartridge, and the bullet is shot forward on its journey. There is a spiral groove inside the barrel of the rifle, into which the bullet fits, and as the bullet is fired out, the groove makes it revolve rapidly, increasing its speed and the accuracy of its flight.



The shot is now fired, and the bolt, the outside of which is shown here, is drawn back by pulling the knob k. The brass rim of the cartridge case is caught in a little notch, marked in the picture, and as the bolt is pulled out it draws with it the empty cartridge case, and lets it fall without the necessity of touching it. The spring of the magazine, in which are a number of cartridges, now pushes another cartridge up into the line of the bolt, which, on being closed, fits the cartridge into place. There are several other types of repeating rifle but the principle is the same.

CONTINUED ON PAGE 5855

The approach to St. Peter's, the greatest church in the world

CONTINUED FROM PAGE 5776

WHAT I SAW IN ROME

A LETTER FROM THE ETERNAL CITY

If I were clever enough to write a book, I should like it to be about Rome, and I should like it, I think, to be in three great chapters. There would be, first, the mystery of Fallen Rome, the vast world-ruin here at our feet, and its strange spell over us as we walk about it, as of a magnet from a grave. There would be, second, the power of the beauty of Rome, the compelling force that lies in such a store of wonderful things that men can hardly dream of. And there would be, again, the Voice of Rome, the stirring of emotions that must come to the coldest heart that comes to Rome, the central home of man.

Rome is, in truth, the Eternal City; we may say of it that its past and its present and its future are one. Time rolls back in Rome as in a book. We walk on the very dust of Cæsar, and every step we take is on historic ground. Fallen Rome, the Rome which ruled the world for 500 years, and had a world-wide empire before Jesus was born, is twenty feet under us wherever we go. Cæsar's palace, Peter's prison, Paul's lodgings — they are the foundations of the earth that we tread from morning till noon, from noon till night. The huge area of the Forum has been laid open; here and there elsewhere a fragment has been dug up, a cellar has been excavated, and every day men dig up bits of the Roman Empire. But it is only bits, and Rome must be razed to the ground if the wondrous things beneath it are to be revealed.

What these wonders are we know in part. There are no ruins in the world so thrilling as these. The difference between Egypt and Rome is this, that the interest in Egypt is historical, the interest in Rome is human. We know almost nothing of Rameses; we know almost everything of Cæsar.

And Rome brings Cæsar as near to us as Napoleon. We walk across the place where Julius Cæsar lived. We stand on the spot where he was stabbed by Brutus. From the only authentic statue of him, on the Capitol, we can walk down into the great Forum, and read Mark Antony's speech in the place where Antony spoke.

I shall not try to picture the Forum. I suppose there is no other site on the earth in which is concentrated so much history of the world. Out of the little narrow streets you come suddenly upon a great flight of steps, handsome and steep. To the left is another flight, higher and steeper still, with a church at the top. One day, long before any of us was born, a man walked up these steps, sat down in that church, and listened to the monks singing vespers. One of the great hanging lamps was swinging to and fro, and somehow the swing of the great pendulum of Time came into the man's mind: he thought of the Capitol above, and the Forum below, and of all that they had been; and he came down those steps to write "The Decline and Fall of the Roman Empire."

Up the other side of the steps is a winding way to the top for carriages. We run up the central way, past the ancient statues, past the milestone from the Appian Way — which Paul must have looked upon and said, "Still seven miles to Rome" — past the cage of living wolves kept there in memory of Romulus, into the great square. Let us go, first, to the left, into the Capitoline museum, and spend five minutes in the most amazing portrait gallery to be found anywhere.

THE ROOM FULL OF EMPERORS

Here, in a little room no bigger than a dining-room, are the Roman emperors, with their wives and families and friends, imaged in marble by those who knew them. You feel here, as nowhere else, that these men were real, and you know what we mean when we say that Rome impressed its image upon the world for all time. For here is Rome; here are the Cæsars. Here is Julius Cæsar, next to him Augustus and his mother. Here is Marcus Aurelius as a boy, then as a man, then his wife, then his daughter, then her daughter's husband. Then the next emperor, who, they say, was murdered, then the wife who murdered him. Here is Nero's mother, who killed her husband — also here — to make way for her son. Then Nero, who killed his mother.

In the middle is the fine equestrian statue, in bronze, of Marcus Aurelius, the emperor and philosopher who lived before Christianity had made its way, and might have changed the history of mankind if he had been born a little later. Among the faces that we meet in Rome are some that haunt us as we go about, and we never forget the face of Marcus Aurelius, or the half-sad, thoughtful face of the young Augustus.

IF CÆSAR COULD HAVE MET JESUS

I like the face of Augustus, whose beautiful statue holds all travellers in the Vatican sculptures, and I verily think that if he could have met Jesus, if they could have sat here, in the Capitol, looking over Rome, and have talked for an hour, he would have accepted the religion of Jesus and changed the course of Rome. There would have been no Crucifixion, Jesus would have conquered the world in His own day, the long and terrible history of Christianity would have been utterly different, and the mind of man cannot conceive the glory that might have been. But I feel that even more certainly would this have happened if Marcus Aurelius had reigned when Augustus did, and if he could have known Jesus of Nazareth. But let that go: the Crucifixion happened. I saw, this afternoon, the first picture of it in existence — a caricature on marble, drawn probably by a page in Cæsar's palace, 300 years after the Crucifixion happened.

THE WONDERFUL RUBBISH HEAP

Let us leave the Capitol, and come down to the Forum on the other side. It is disappointingly small to the eye at first, but it grows and grows, and lengthens and lengthens, and widens and widens, until it is a very wilderness of doom. We must have in our minds a clear notion of what has happened in the Forum since the days when this place was the central architectural glory of the world. As the history of Rome was submerged by the coming up of other nations, so the very monuments of Rome were buried in the dust of centuries. The palaces of Cæsar fell.

Their temples broke in pieces, and hundreds of years of ruin left Rome a rubbish heap. By the time the twelfth century came, the place where these marvels had stood was an impassable wilderness of rubbish. Orchards and

CÆSAR IN TRIUMPH AND HIS PALACE IN RUIN

AN EMPEROR OF ROME IN A GREAT TRIUMPHAL PROCESSION

This picture is from the painting by F. W. Topham, and is published by permission of the Corporation of Leicester.

PALACE OF THE CÆSARS ON PALATINE HILL, AS SEEN TO-DAY FROM THE FORUM gardens sprang up where temples had been, and the avenues of triumphal processions were covered with teams of oxen. The peasantry grazed their cattle here; mechanics set up their workshops here; and only a few tops of columns standing out from the earth suggested the wonder that lay beneath. The very name of Forum was forgotten, and so little was to be seen that, even at the beginning of the nineteenth century, Lord Byron wrote of one of the highest columns in the Forum to-day, and called it "the nameless column with the buried base."

ROME COMING BACK TO SIGHT

Stroke by stroke men have carried on these excavations, and the thought that comes is of the wonderful sight Rome must be underneath. If only we could take the lid off! Four street-levels have been found, and the levels of the streets of ancient Rome lie sometimes twenty-four yards down, and never less than eight yards down, from the level of the streets to-day. Broken columns, ends of temples, beautiful porticoes, ruined halls, mosaic pavements, rostrums, altars, fountains, inscriptions, lines of broken statues, houses with three stories, steps leading down to cellars and up to churches, enormous walls of red brick stripped of their original marble, exquisite reliefs, triumphal arches — all stretching across the vast space which begins at the base of the senators' huge palace and reaches to the arch erected by Titus after the destruction of Jerusalem, with the Colosseum and the Arch of Constantine in the background. Framing it on the right, high up like a ruin in the skies, is the palace of the Cæsars.

HERE ONCE UPON A TIME

The traveller is bewildered as he stands amid this ruin, and tries to picture what this place was once upon a time. Here in the Forum, in the days when emperors walked about among their people, were twenty-five acres of halls and temples and triumphal arches; 1,200 marble columns and 1,000 colossal statues; miles of porticoes, shops full of treasures, galleries full of great pictures; the Senate House and the Archives of the Empire of the World. And it was not a show, all this wonder; it was not only to look at, but to *endure*. It was a thing of beauty made to be a joy almost for ever. So well did they build, these Romans, that columns stand to-day in the open streets of Rome where they were set up 2,000 years ago. So well they did everything that the great drains out of the city are still in use to-day, 2,000 years after they were made. They are big enough, as a writer said 2,000 years ago, for a hay-cart to pass through.

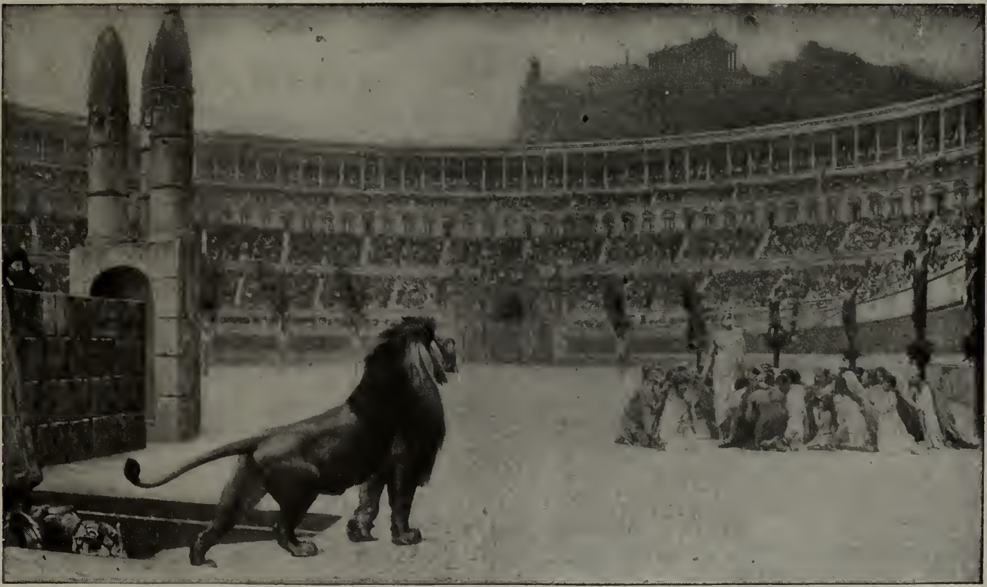
Imagination almost reels to think of the gigantic splendour of this place in days when Rome was Rome indeed. It is wonderful to see the vastness of the ruins, to go round to the left of the Colosseum and see it *whole;* then, walking slowly round, find that this great thing is broken!

THE WILD BEASTS OF THE COLOSSEUM

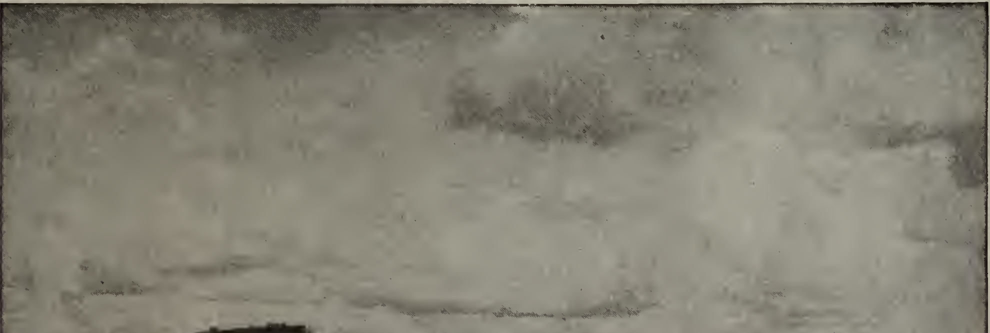
The mind simply cannot picture the Colosseum as it must have been, yet palaces and temples and tombs have been made of marble taken from this single ruin. Twelve thousand captive Jews are said to have been engaged in building this huge place, of which the outside walls alone cost twenty times as much money as St. Paul's. Three times round the outside walls is a mile, and the walls rose high enough towards the sky to hold twenty tiers of seats for 80,000 people, and in the midst of them, on a throne of ivory or gold, sat Cæsar. A thousand beasts were slain in this arena to keep an emperor's birthday, and how many death-cries have gone up from this place none can tell.

Once upon a time there were four hundred kinds of plants among the ruins, and the first seeds of many of them may have come from the cages of wild beasts brought from distant lands. So that it is a thrilling thing to pull a leaf or to pick a flower that is growing here, for we hold in our hand a living thing that may go back to a great day at the Colosseum, when hungry lions were let loose on the followers of Jesus and St. Paul to entertain an emperor on an ivory throne.

THE TERRIBLE COLOSSEUM: AS IT IS AND WAS



THE TERRIBLE SIGHT IN THE COLOSSEUM IN THE TIME OF THE CÆSARS
This picture is from the painting by I. L. Gerome, and is published by permission of Messrs. Goupil & Co.



THE RUINS OF THE COLOSSEUM AS SEEN TO-DAY IN ROME

Yet even the great Colosseum can never have seemed so dazzling to the Romans as the very ruins of it seem to us, for the world in which they moved was so luxurious that one of them wrote complaining that he could hardly tread except on precious stones. A theatre built for a ceremony of two or three days only is said to have been the greatest work ever made by the hand of man. It had three stories — one of marble, one of glass, and one of gilded wood; and the bottom story was supported by 360 marble columns.

There have been counted in Rome to-day 9,000 columns of marble still unbroken, and it is said that there must have been in those days 450,000 of these columns at least, and some which have been found were six feet across. We have only to walk into the baths of Caracalla, or into the baths of Diocletian just outside the station, to see how utterly words fail to describe the vastness of all these things. Diocletian loved big things, and it is said that when he built his baths in Rome he set 40,000 condemned Christians to work on them, laying out these baths, with their lovely mosaic floors and wonderful marble walls, to cover 400,000 square yards and to accommodate 3,000 bathers. Such was the splendour of Rome.

THE CONQUERORS OF ROME UNDER GROUND

And while Rome lived in pomp and splendour in the sun, her conquerors were hiding underground. Down in the tombs were the persecuted Christians, driven to worship, and perhaps to live among the dead. Forty groups of catacombs have been found outside the gates of Rome, cut out sometimes five deep in the ground, so that we may walk about in them to-day at a depth of forty feet below the surface, and walk so far in them that, if we went from end to end, we should travel over 500 miles, or as far as from London to Paris and back again. Down in these tombs were the persecuted followers of the Carpenter of Nazareth, whose apostles had been led out of the gates to be crucified. The Romans would have laughed if somebody had said that these poor men hiding underground were founding an empire greater than their own.

The great wonder that has grown upon me is the wonder of the Two Empires. Think of the fact that at one time there were in Rome on the same day two such men as Nero and Paul. Nero lived in a golden house; Paul was in chains. Yet Nero's empire has gone — you can hardly find a fragment of Nero in Rome to-day; he is the deadest of the emperors. Paul's empire has come, and it endures for ever. Peter and Paul fill Rome to-day.

THE STILL SMALL VOICE THAT CONQUERED ROME

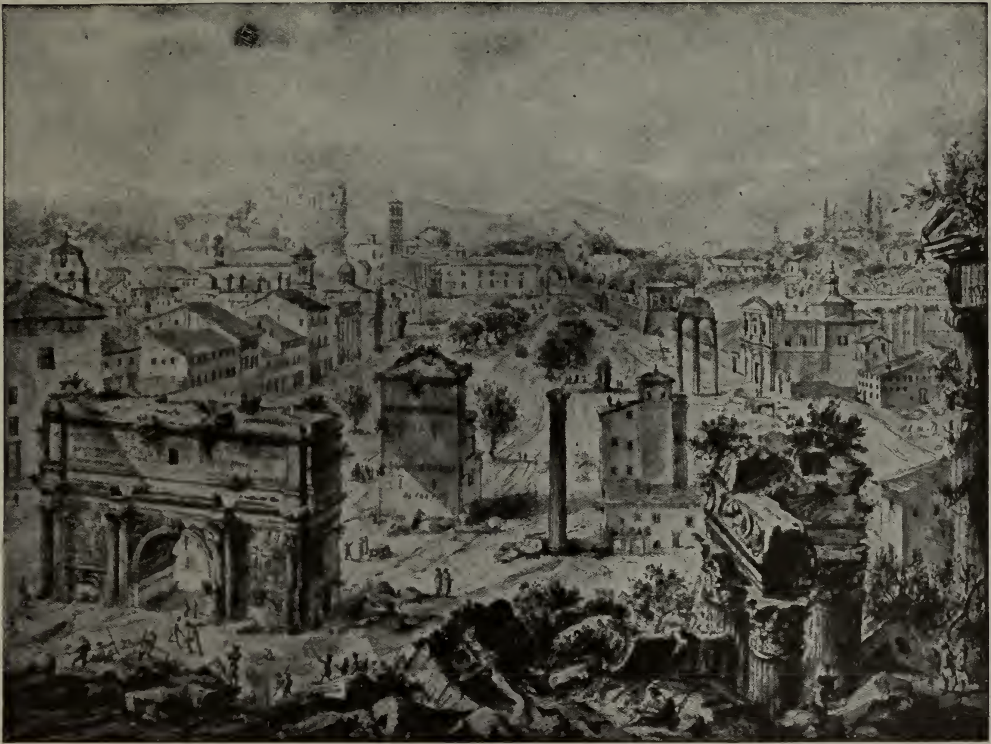
Few things can interest the traveller more than to go from spot to spot and hear the still small voice. You could hardly hear it in Rome 1,800 years ago. Go down into the catacombs, and realise that 1,800 years ago there were but a handful of Christians in Europe and that they had to hide *down there!* See their secret chapels, their graves, their paintings on the walls. The emperors were on the Palatine, in the Forum, at the Colosseum; the Christians, if they were not being torn to pieces by the lions, were singing in the catacombs.

We follow Paul and Peter everywhere; stand where they stood, go into the house where, perhaps, Paul wrote his letter to Philemon, see over the house of Pudens, wonderfully well preserved. We ride along the Appian Way, by which Paul came to Rome — miles of it we ride along, between miles of broken tombs. We pass under the gate through which he walked to martyrdom, to the place where he died.

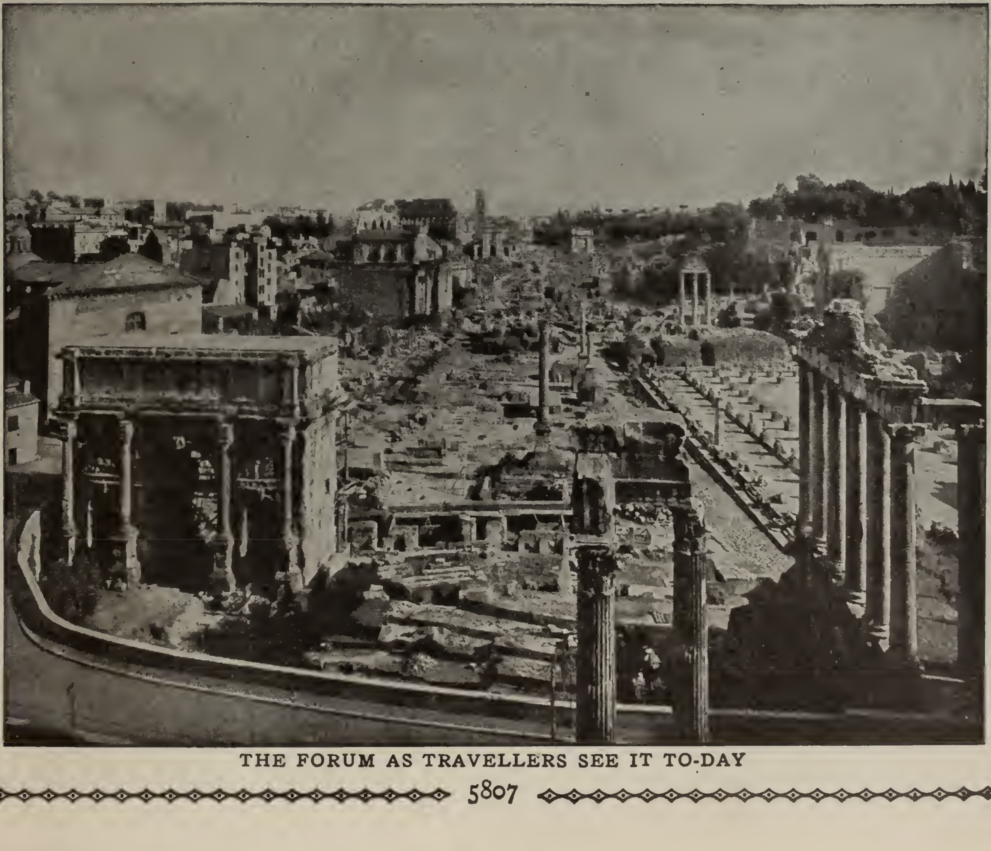
THE JEWEL OF ROME

It is to me a wonder that I cannot express that here was a great civilisation *before* Christianity, that Christianity came into the very heart of it and was crucified, that the civilisation ceased to be, the greatest power in the world broke down, and the persecuted Christianity inherited its greatness, establishing its empire throughout the earth for all ages to come, so that to-day, when the Cæsars are so dead that men store coal in their palaces and drink

HOW THE FORUM BECAME A RUBBISH HEAP

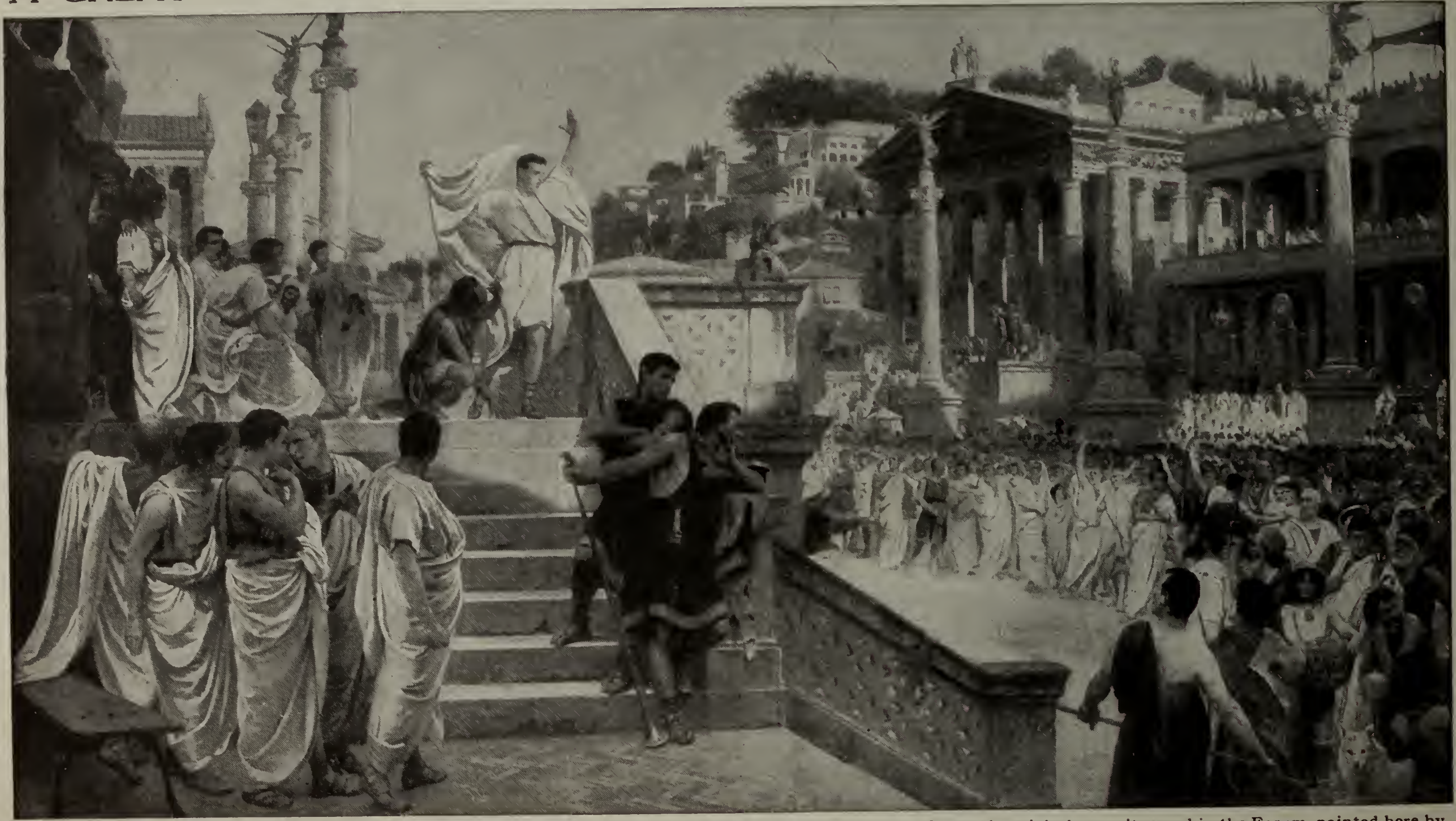


THE FORUM AS TRAVELLERS SAW IT TWO HUNDRED YEARS AGO



THE FORUM AS TRAVELLERS SEE IT TO-DAY

A GREAT DAY IN THE ROMAN FORUM DURING THE LIFE-TIME OF JESUS



If Jesus could have gone to Rome during his life-time on earth, as Paul and Peter did afterwards, this is the kind of scene he might have witnessed in the Forum, painted here by Professor Prospero Piatti. While Jesus was talking quietly to the people in the villages of Palestine, laying the foundations of the Empire that was to cover the earth, the Emperors of Rome were living in glory and power, not dreaming that their empire was to pass away, conquered and transformed by the teaching of Jesus of Nazareth.

liquor in their tombs, the great glory of Rome is the tomb of a fisherman whom Nero crucified.

For St. Peter's is the jewel of Rome. We should be careful in calling a thing sublime, but St. Peter's is sublime. Out of a long, mean street, we emerge into the vast square, where George Eliot felt that nothing small or mean could come. Everybody knows the picture of it, with the half-circle of high columns leading to the ends of the facade, about 150 yards in front of you. There are hundreds of these columns in four lines, and through the middle avenue a carriage and pair can pass. Each front column has a statue on the top. The vestibule, approached by a flight of steps much wider than St. Paul's, is perhaps fifty yards long, and looking down from the ceiling are probably twenty statues, almost lost in the vastness, though they must be of enormous size. Pulling back the heavy leathern curtain which hangs before the great door, we step inside.

THE MARVELLOUS DOME

I wish I were able to tell you how vast and beautiful it is. It is twice as big as St. Paul's, and it is *light* everywhere. As you walk slowly towards the tomb of St. Peter, under the central dome, the beauty of the place grows upon you and becomes a dream; you lose the world of sense, and live as in a vision. Nothing but the sight of it can convey to you a sense of its great beauty.

Perhaps there is no dome like this anywhere; it is higher and wider than the dome of St. Paul's, I think, though that is nothing. It is as light as it can be, and its simple decorations — probably eighty pictures on a soft gold ground, in slanting panels — can be easily and clearly seen, though they are so high that the lettering has to be longer than a man, and a pen in St. Luke's hand is longer than St. Luke actually was himself.

Four huge pillars, each vast enough to occupy the space of a thousand standing men, hold up the dome, and around the church are a dozen other domes, over a dozen chapels, all bigger than the average English church, and unspeakably more lovely. There is not a chair in St. Peter's, I think, only a wooden seat or two here and there, and the great marble floor is free.

INSIDE ST. PETER'S

And as you wander in this great place, seeming to grow more spacious and more lovely as you walk about it, you come to feel that it is one of the world's master-places. I have not given you an adequate conception of its size. I cannot describe the effect of walking up and down the aisles, in and out of the chapels, across the transept and back again under the great dome. I have walked round and round St. Peter's with my eyes fixed on its vaulted roof, and as one dome passes out of sight and another comes into view, as the rich gold of the great arches strikes the eye, as the great mosaics and frescoes come — one of them representing nine men's work for ten years, ninety years of human labour — as the white marble tombs loom before you, the great silence of the place growing upon you all the while, you are overwhelmed, in spite of Byron's saying, that as you enter St. Peter's your mind grows colossal with the place, and therefore you are not overwhelmed.

THE TREASURE-HOUSE OF THE WORLD

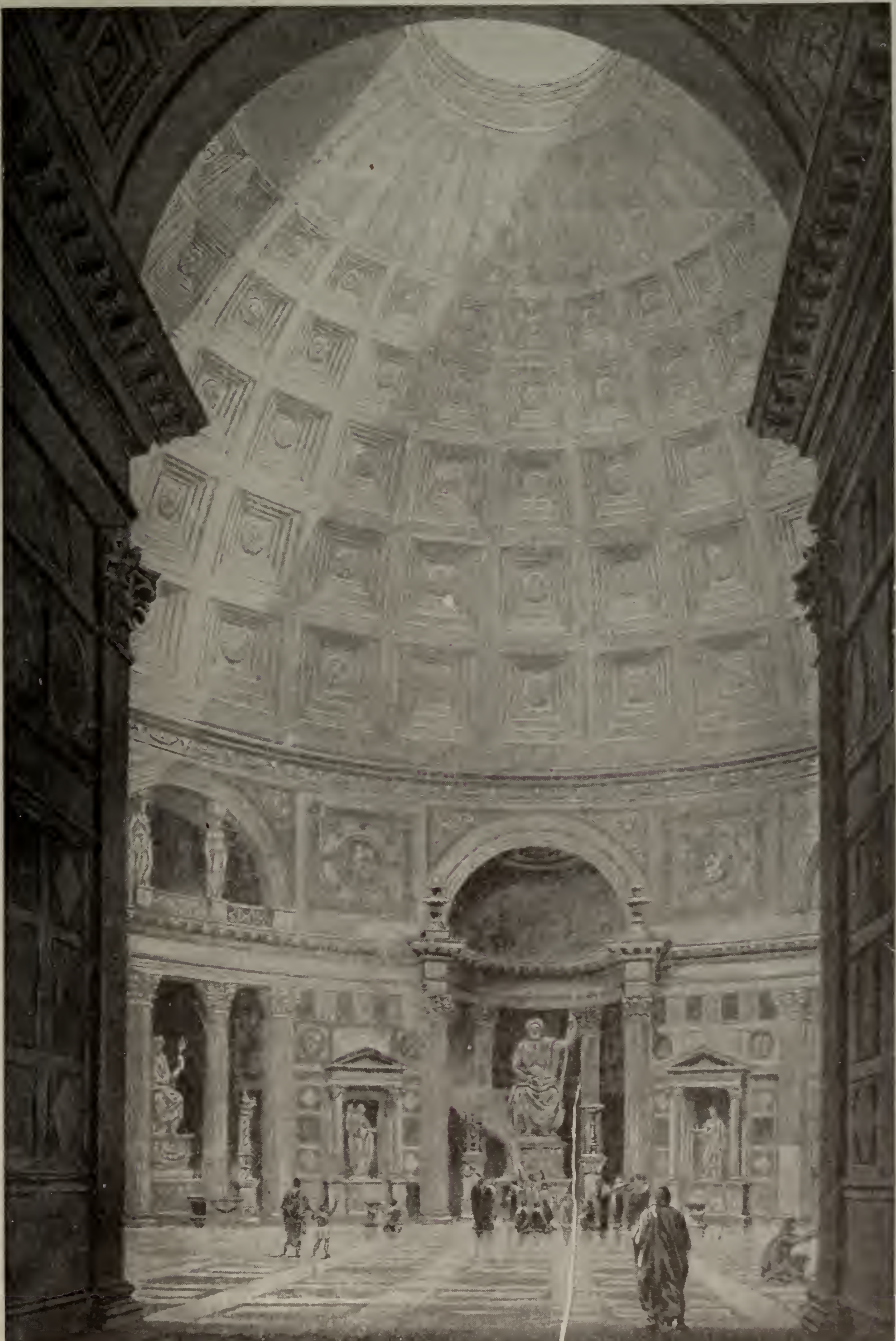
Yet this marvellous place is only a part of a place; it is only one part of the greatest buildings in the world today. If it stood alone in a desert, men would build a railway to it. It is, of course, the wonder-house of the world, as full of priceless treasures as the sea is full of salt; yet it stands not alone in its glory, but here in Rome among a thousand wonders. It is the greatest palace and the greatest church on the face of the earth. It covers over thirteen acres. It is said to have a thousand halls and chapels and apartments, and over one ceiling alone Michael Angelo gave up four hard-working years of his life. Whether this roof, or a roof that Raphael painted, is the greatest thing in art is an endless controversy among those who understand these things; but the Vatican will not be jealous whichever way the problem is decided, for

CHRISTIANITY'S HOME IN ROME, THEN AND NOW

The central home of Christianity in Cæsar's time: a funeral service in the Catacombs.

The central home of Christianity in Rome to-day: inside St. Peter's.

SUNLIGHT FALLING IN THE PANTHEON



THE PANTHEON, THE OLDEST PERFECT BUILDING IN THE WORLD, OPEN TO THE SUN

The Pantheon, completed in the 2d century, perhaps the best-preserved building of antiquity, is lighted by an opening, 30 feet across, in the dome, through which sunshine and rain have poured for 1,800 years.

both these roofs are here within its walls. Here Raphael painted for quite twelve years; here Michael Angelo must have chiselled and painted for most of his life.

MILES OF SCULPTURES AND PICTURES

Here is a gallery of pictures which no money in the world could buy; here are miles of sculptures, startling and thrilling and lovely things, which almost speak aloud of the world that was for ages and ages before a Parliament sat at Westminster. Here is Augustus, the mail-clad ruler of the world, who found Rome brick and left it marble; he who ordered the census which took Mary to Bethlehem and made a manger sacred and immortal as the birthplace of an empire compared with which the empire of Rome was like a home of ants. Here he stands, this splendid Cæsar, seeming, as somebody has said, as if he were speaking those words which Virgil wrote of him: "Din of arms shall cease, and days of hardship shall be softened." Here, too, is Demosthenes, chiselled by a man who knew him, his face caught at the moment when he is trying to catch the ear of a frivolous crowd by warning them of a danger to Athens, and we seem to hear him crying, "Oh, Athenians, my countrymen, when I talk to you of political dangers you will not listen, and yet you crowd about me to hear a silly story about an ass."

Here is the famous Laocoon, that terrible group of a father and his sons in the coils of a snake; one of the very greatest sculptures in the world, which stood in the palace of Titus, the conqueror of Jerusalem, who came back to Rome and set up a beautiful arch, on which is seen to-day a picture of the Temple swaying in its fall.

THE WONDER THAT IS EVERYWHERE

But it would need books and books and books to tell of what is here; and so packed with wonderful things is Rome that a book could only begin to describe it. Through the heart of the town runs the famous Corso, the Strand of Rome. At one end of it is the convent where Luther stayed on that visit to Rome which opened his eyes, and sent him out into the world to start the Reformation. Not far away sleeps the man who perhaps may have kept the Reformation out of Italy, Ignatius Loyola, who took a little band of men into a chapel here and swore them to be faithful, and founded the Order of Jesuits, which has covered the earth. A little distance off sleeps Fra Angelico, whose pictures travellers love to see, and beneath the altar of that same church, with the lights that never go out shining in the dimness, is the figure of a woman in a tomb with a glass front and two burning lamps in it. She is Catherine of Siena.

THE MYSTERY OF THE ETERNAL CITY

And so on for ever — for it is not possible even to mention here a thousand things that travellers come to Rome to see. You must come to see them. You will wonder at the narrow, unpaved streets made of lava-stone; at the confusion of men and horses mixed up everywhere. You will wonder at the sound of running water in the streets, especially at night, when the trickling of the fountains is weird and odd. You will wonder at the frescoes on the walls of the houses, lit up sometimes at night with electric lamps; and if you are passing a great house in the dark you will be startled, perhaps, by the appearance of white figures seeming to step out into space from niches in the wall. You will start back at the sight of living wolves close to you on the Forum steps. It is part of the weird mystery of the Eternal City, the spirit of the Colosseum, the memory of the Forum, the something that creeps out of Caligula's palace at night and fills the air with terror of the Past.

And, once you come to Rome, there will come into your life something that will never leave it until life ends, and you will want to come to Rome again and again and again, to feel yourself a far-off looker-on, through the veil of centuries, at the greatest pageant that Father Time has ever seen.

ARTHUR MEE.

CONTINUED ON PAGE 5813.